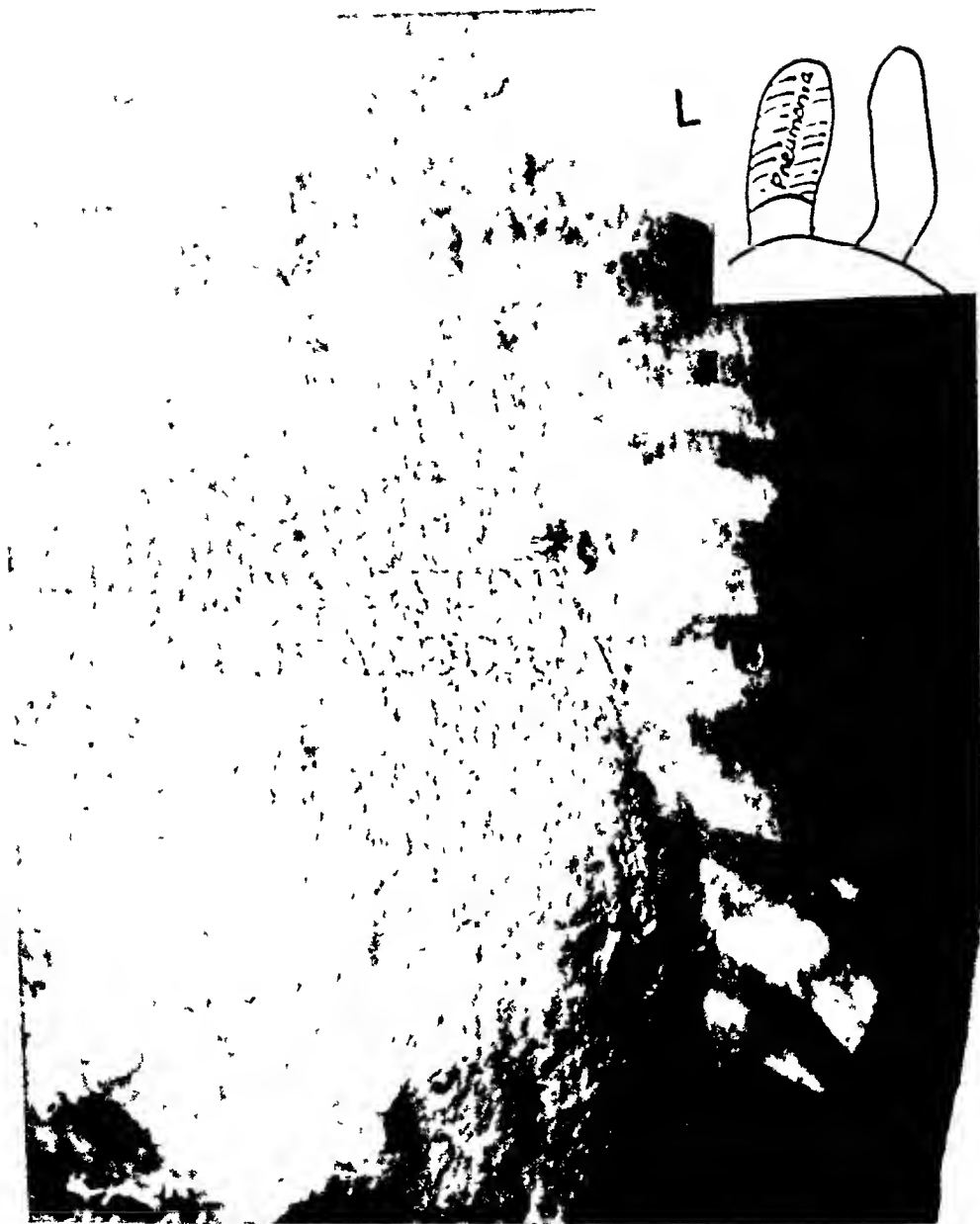


A DESCRIPTIVE ATLÁS
OF RADIOGRAPHS



ACUTE LOBAR PNEUMONIA

From the collection of Dr. J. H. Watson, 1891-1901

(From the collection of Dr. J. H. Watson, 1891-1901) The whole of the upper part of the right lung is affected, and the lower part is also affected. Comparing this picture with that given in the preceding page, it is seen to be localised accurately to the upper and lower lobes.

Dr. HORMIS WATKINS

A DESCRIPTIVE ATLAS OF RADIOGRAPHS

AN AID TO MODERN CLINICAL METHODS

BY

A P BERTWISTLE, M B, Ch B, F R C S Ed

SEVENTH EDITION REVISED AND ENLARGED

WITH 980 ILLUSTRATIONS

LONDON
HENRY KIMPTON
25 BLOOMSBURY WAY, WC 1
1949

<i>FIRST EDITION</i>	<i>MARCH</i>	1926
<i>SECOND EDITION</i>	<i>NOVEMBER</i>	1931
<i>THIRD EDITION</i>	<i>MAY</i>	1936
<i>FOURTH EDITION</i>	<i>APRIL</i>	1939
<i>FIFTH EDITION</i>	<i>APRIL</i>	1942
<i>SIXTH EDITION</i>	<i>OCTOBER</i>	1946
<i>SEVENTH EDITION</i>	<i>APRIL</i>	1949

ALL RIGHTS RESERVED

RESPECTFULLY DEDICATED
TO
THE RIGHT HON. WINSTON CHURCHILL, O.M.,
The greatest of Britain's sons

4691
7.5.57
old.

PREFACE TO THE SEVENTH EDITION

It is once again my pleasant duty to thank those whose kindly help alone has rendered this Atlas possible, but before doing so I wish to record my deep sorrow in the passing away of many other contributors. The Atlas has sustained a serious loss in the death of Mr Lawford Knaggs, who scrutinised all bone radiographs. Inevitably much of their work will have to be replaced by newer work, but it is as they would wish they have blazed the trail and they would have expected those coming after them to carry it further.

The greater number of bone radiographs were collected from the vast resources of the General Infirmary at Leeds, where I was Resident Surgical Officer, with the kind permission of the Honorary Surgical Staff and the assistance of Dr Scargill and his Radiological Staff. Dr Rowden gave me free access to his splendid collection, additional plates were furnished by the late Mr Bunnett, Dr Rhys and Dr Salmond. I am most grateful for a series of pictures kindly given me by the Radiological and Surgical Honorary Staffs of the Nottingham General Hospital. The section dealing with the nasal sinuses is the work of the late Sir William Milligan. Mr Robertson and Dr Rowden, jun. The dental section, previously the work of Mr Marver has been augmented by Mr Forgan.

The alimentary system is the work of Dr Rowden, Sir Edmund Spriggs, the late Sir David Wilkie and Dr Rowden, jun. The urinary system is the work of the late Professor Fullerton, Mr Huggins, the late Mr Frank Kidd, Dr Rowden and the late Mr Jocelyn Swan. Dr Watkins has added further valuable material to the respiratory section, originally the work of Mr Morrison Davies, Dr Peter Edwards, Dr Johnston, and Dr Ramage. The late Professor Sicard furnished examples of lipiodol injections of the spinal theca. Mr Norman Dott a series of brain tumours, and Mr Pattison several ventriculograms.

It has been very difficult to collect more radiographs since this World War, when everyone has their time more than fully taken up. A section devoted to helminthology has been started. Mr Lewin and Mr Harrison

have contributed more interesting cases. Dr Hodson is a welcome newcomer, contributing many examples of tuberculosis. F. H. Frier's untimely death was a blow, he was a keen worker, and is succeeded by an equally keen one in F. Tolley. I take this opportunity of asking readers to submit radiographs either of diseases not included or which would be improvements on existing pictures.

I am grateful to Mr Schall for his chapter on "The Clinical Application of Radiology," and to Mr Shields of the B.M.A. Library for much help; also to Mrs McGraw of the Dumfries Secretarial and Typing Agency.

A. P. BERTWISTLE

INTRODUCTION

THE object of this book is to show the immense possibilities of X-rays. It is an attempt to portray, as far as is possible in the space available, as many of the normal and abnormal conditions that are met with in practice. It is written by a clinician for clinicians.

It is difficult to see how the profession can "feed" the Radiologist with suitable material unless he knows the capabilities of X-rays.

Although there are excellent courses and text-books for those taking up Radiology as a whole time occupation, and that excellent monumental work of S. C. Shanks, P. Kerley and E. W. Twining *A Text Book of X-ray Diagnosis*, there are few of either for those who, engaged in general or special practice, seek the help of X-rays in confirming or giving precision to their diagnoses. Although the author hopes that the work will be of use to Radiologists, it is primarily intended for the use of the clinician who, without being concerned with the technical side, yet desires to know what X-rays are capable of revealing to him.

There is a lamentable lack of teaching facilities available for those who qualified before the advent of X-rays, or before they became so generally used. On the other hand, little, if any, can be crammed into the present-day student's overflowing curriculum, unless in the form of optional lectures to senior students. It is hoped that this book will stimulate his interest so that, after qualifying, he may pursue the subject further.

No conscientious worker in medicine or surgery can afford to neglect any method of approach to a clinical difficulty which makes for earlier or more accurate diagnosis. Radiology can certainly do this in many obscure conditions and can rule out organic disease in others. The *Pathology of the Living*, as it has aptly been termed by the late Lord Moynihan, is admirably suited for study and is far more important to the clinician than that of the dead. In spite of the difficulty in obtaining them, several serial radiograms are included showing arrest or progress of disease, such work has not been pursued in this country as much as it deserves. As far as possible the earliest manifestations of disease are depicted, time will show that many clinical signs and symptoms are in fact complications, the condition having been diagnosable much earlier by X-rays. To write of the symptoms of carcinoma of the stomach as

vomiting, wasting and coffee-ground vomit is not true; these symptoms are frequent complications, when all hope of radical cure may have passed.

Already X-rays feature largely in medico-legal work—so much so that Medical Protection Societies will not give cover where a fracture has not been radiographed. The day may come when failure to examine for early malignant disease, by this means, will be viewed as want of care. The same may be said of exploratory operations when sufficient information could have been obtained by a less painful and dangerous means.

No special technical knowledge is required for the understanding of this book once the basis of Radio-diagnosis is grasped—namely, X-RAYS PENETRATE DIFFERENT MEDIA TO VARYING EXTENTS, THUS CASTING SHADOWS OF DIFFERENT DENSITY. Undoubtedly one reason for the general practitioner's lack of knowledge of the subject is its amazingly rapid progress. The presentation in this work of a number of pictures with descriptive and clinical notes will enable him to realise what cases are suitable for examination. Normal plates are on the left-hand pages, so as to be the more readily compared with those of the abnormal on the right-hand. Many examples of common conditions are given in preference to rarities, save when these are of special interest.

A certain number of plates, particularly of the bones, appeared in the first edition. Owing to the rapid progress of medicine during the last twenty years many diseases, once common, are never seen in their advanced state nowadays. For example, rickets—the English disease—is now rare, syphilis has lost much of its sting, acute osteomyelitis responds to the sulpha drugs and penicillin. Osteomalacia is cured with cod-liver oil, varicose ulcers are cured before they have time to involve bone; certain tumours, *e.g.* Ewing's, are destroyed before becoming fatal, by X-rays. In fact, certain conditions depicted will be of value as museum curiosities in a few years' time.

If, by means of this Atlas, medical men are encouraged to resort to Radiology when confronted with clinical difficulties, the writer's ambition will have been achieved.

A. P. BERTWISTLE

MAXWELL HILL
DUMFRIES, SCOTLAND

CONTRIBUTORS

CLINICIANS

I A BULMORE MRC S I R C P F R C S F D	Wisbech
D I CHAFFERS MB Ch B	Birkenhead
H MORRISTON DAVIES MD MCh I R C S	Ruthin
I S DIBBINHAM MB BS BSc	Scarborough
C W DIXON MD	Leeds
NORMAN DOIT CBI MB Ch B I R C I Id	Edinburgh
PETER EDWARDS MB Ch B	Market Drayton
J B FIORAN IDS	Mirch
S R CLOYNI MB Ch B DPH	London
J O HARRISON, BA, BCh I R C S	King's Lynn
H B HODSON MD MRC P DPH	King's Lynn
C I S JACKSON MB BS I R C S	King's Lynn
J M JOHNSON MB Ch B DPH	Aberdeen
J IIWIN MB BS F R C S	King's Lynn
W B R MONTIETH MA I R C S Id	Lincoln
N MUTCH MD F R C P	London
A R D PATTISON MB BS F R C S	Newcastle on Tyne
G BAYACF MB Ch B	Stafford
R O ORAMHIA	Newcastle on Tyne
C D ROBERTSON F R C S	London
H T ROPER HALL MB MDS IDS	Birmingham
S N STANT MB B S I O N D	Cape town
S WATSON SMITH MB Ch B	Bournemouth
SIR EDMUND SPRIGGS MD I R C P	Ruthin
I HOLMIS WATKINS BA BM BCh	King's Lynn

RADIOLOGISTS

T I CANDY MB Ch B DMR I	Newport Mon
A C FOWLER MB Ch B DMR F	Aberdeen
K HERMAN	Subotier
J B HUGGINS	Manchester

O. RHYS M.B., Ch.B.	Cardiff
L. A. ROWDEN, M.B., C.M.	Leeds
W. H. ROWDEN M.B., Ch.B., D.M.R.E.	Leeds
R. W. A. SALMOND, O.B.E., M.D., Ch.M.	London

RADIOGRAPHERS

E. J. BARBER, M.S.R.	London
J. CHADWICK	Leeds
W. B. GRAY	London
F. KITCHIN	Leeds
O. A. MARXER	Rutlin
J. W. MASON	London
F. MELVILLE, M.S.R.	London
W. E. SCHALL, B.Sc.	London
P. TOLLEY M.S.R.	King's Lynn

Contributors who have passed on but whose work is being continued:

J. B. BARNETT, F.R.C.S.
H. H. BROWN, O.B.E., M.D., F.R.C.S.
W. McADAM ECCLES, M.D., M.S., F.R.C.S.
F. H. FRIER, M.S.R.
A. FLETTERION, C.B., C.M.G., M.Ch., F.R.C.S.I., F.A.C.S.
BASIL HALL, M.A., M.B., Ch.B., F.R.C.S., F.R.C.S.Ed.
SIR ROBERT JONES, K.B.E., C.B., M.Ch., F.R.C.S., F.R.C.S.Ed.
FRANK KIDD, M.A., M.Ch., F.R.C.S.
R. LAWTON KNAGGS, M.S., F.R.C.S.
ROBERT KNOX, M.D.
SIR WILLIAM MITTIGAN, M.D., C.M.
L. O'SHAUGHNESSY, M.B., B.S., F.R.C.S.
J. A. SICARD, M.D.
S. F. SHIBING, M.B., B.S., F.R.C.S., F.F.R.
R. H. JOCELYN SWAN, O.B.E., M.S., F.R.C.S.
SIR CHARLES SYMONDS, K.B.L., C.B., M.D., M.S., F.R.C.S.
SIR DAVID WILHELM, K.B.L., M.D., Ch.B., F.R.C.S., F.R.C.S.Ld.

The names of the clinicians appear on the right, those of the radiologists or radiographers on the left side of the foot of the text.

LIST OF ILLUSTRATIONS

Acute Lobar Pneumonia

Frontispiece

FIGURE		PAGE
1	Diagram	5
2	The 'G P' Viewing Box	10

SILHOUETTE RADIOGRAPH PROCESS

3	Hand Ordinary Radiograph	56
4	Hand Over Exposed Radiograph showing Skin Outline	56
5	Hand Silhouette Radiograph First Stage	56
6	Hand Silhouette Radiograph, Final Stage	56
7	Dislocation Shoulder	61
8	Bullet in Ankle Ordinary Radiograph	62
9	Bullet in Ankle Over Exposed Radiograph showing Skin	62
10	Bullet in Ankle Silhouette Radiograph First Stage	62
11	Bullet in Ankle Silhouette Radiograph Final Stage	62

NORMAL BONES AND EPIPHYSES

12 13	Skull Lateral	64
14	Skull A P	66
15	Shoulder	68
16	Elbow A P	70
17	Elbow Lateral	70
18	Wrist Lateral	70
19	Wrist A P	70
20	Hip	72
21	Ankle Lateral	72
22	Knee Lateral	72
23	Knee A P	72
24	Ankle and Foot Lateral	74
25	Ankle A P	74
26	Foot A P	74
27	Spine Cervical A P	76
28	Spine Cervical Lateral	76
29	Lumbar A P	76
30	Lumbar Lateral	76
31	Axis Atlanto Axial Joint	76
32	Pelvis	78
33	Full Term Fœtus	80

NORMAL BONES AND EPIPHYSES—*continued*

FIGURE		PAGE
34	Shoulder (12 months)	82
35	Knee Lateral	82
36	Knee : A P.	82
37	Hip (15 months)	82
38	Hand and Wrist (2 years)	82
39	Shoulder (Girl, aged 5)	84
40	Hand (Girl, aged 5)	84
41	Elbow Lateral (Girl, aged 5)	84
42	Elbow A P (Girl, aged 5)	84
43	Pelvis (Girl, aged 5)	86
44	Knee Lateral (Girl, aged 5)	86
45	Ankle: Lateral (Girl, aged 5)	86
46	Ankle : A P (Girl, aged 5)	86
47	Foot A P (Girl, aged 5)	86
48	Shoulder (Boy, aged 9)	88
49	Hand (Boy, aged 9)	88
50	Elbow A P (Boy, aged 9)	88
51	Elbow Lateral (Boy, aged 9)	88
52	Wrist and Carpus Lateral (Boy, aged 9)	88
53	Hip (Boy, aged 9)	90
54	Knee Lateral (Boy, aged 9)	90
55	Ankle A P (Boy, aged 9)	90
56	Ankle Lateral (Boy, aged 9)	90
57	Foot A P (Boy, aged 9)	90
58	Pelvis and Hip (Boy, aged 12)	92
59	Shoulder (Girl, aged 15)	94
60	Elbow A P (Boy, aged 15)	94
61	Elbow Lateral (Boy, aged 17)	94
62	Wrist A P (Boy, aged 15)	94
63	Knee A P (Girl, aged 19)	96
64	Knee Lateral (Boy, aged 17)	96
65	Ankle Lateral (aged 19)	96
66	Ankle A P (aged 19)	96
67	Skull Spine Cervical and Dorsal Vertebra, Shoulders (Child, aged 8)	98
68	Spine Dorsal Oblique Lateral	100

CONGENITAL ABNORMALITIES

69	Protrusio Acetabuli	103
70-71	Cleido-Cranial Dysostosis	103
72	Terminid Epiphyseitis	103
73	Metatarsus Primus Varus	105

CONGENITAL ABNORMALITIES—*continued*

FIGURE		PAGE
74	Hand	105
75	Accessory Thumb	105
76	Hand	105
77	Hand Congenital	105
78	Hand Congenital	105
79	Intra uterine Amputation (Hand)	107
80	Webbed Fingers	107
81, 82	Spina Bifida	107
83	Congenital Elevation of the Shoulder (Sprengel's)	109
84	Congenital Absence of the Radius	109
85	Cervical Rib and Process	111
86	Cervical Processes and Band	111

FRACTURES

87	Issured Fracture of Vault of Skull	113
88	Issured Fracture of Occipital Bone	113
89	Fracture Skull	113
90	Fracture Skull	113
91	Fracture Fourth Lumbar Vertebra	115
92	Fracture Spine	115
93 94	Fracture Dislocation of Spine	115
95 96	Fracture Spine	117
97	Fractured Ribs	117
98	Fracture Dislocation of Spine	117
99	Fracture Glenoid Plate	119
100	Fracture Nasal Bone	119
101	Skull Depressed Fracture of Vault Bone Crafts	119
102 103	Mandible	121
104 105	Mandible	121
106	Clavicle Greenstick Fracture of	123
107	Clavicle Fracture of	123
108	Clavicle Middle	123
109	Clavicle Inner End	123
110	Scapula Acromion	125
111	Scapula Glenoid Fossa	125
112	Scapula Axillary Border	125
113	Humerus Neck	125
114-116	Humerus Surgical Neck	127
117	Humerus Fracture of	127
118	Humerus Shaft Lower Third Commminuted	129
119	Gunshot Fractures	129
120-123	Separation of Capitellum	129

FRACTURES—*continued*

PLATE		PAGE
124	Humerus. Lower Third	131
125	Humerus. Supracondylar	131
126	Humerus. Condyle (Old)	131
127	Radius. Head	131
128	Ulna. Olecranon	133
129	Ulna. Olecranon. After Wiring	133
130	Radius and Ulna. Shafts. Greenstick Fracture	133
131, 132.	Radius and Ulna. Shafts	135
133 134	Radius. Colles's Fracture	135
135 136	Radius. Colles's Fracture. After Treatment	137
137	Radius. Chauffeur's Fracture	137
138.	Radius. Smith's Fracture	137
139.	Fractured First Metacarpal	139
140.	Impacted Fracture of First Metacarpal	139
141	Scaphoid	139
142	Separated Epiphysis of Phalanx	139
143	Phalanx	139
144	Bennett's Fracture	139
145	Pelvis	141
146, 147	Tibia: Pott's Fracture A.P.	141
148-151	Fractured Pelvis	143
152	Femur. Neck. Intracapsular	145
153.	Femur. Neck. Extracapsular	145
154, 155	Fracture. Neck of Femur. Smith-Petersen Pin	145
156.	Femur. Shaft. Bee-de-Flûte. Recent	147
157.	Femur. Shaft. Old	147
158	Femur. Injury of Lower Epiphysis. Traumatic Genu Valgum	147
159.	Loose Body in Knee-Joint, resulting from Fracture	149
160	Ruptured Ligamentum Patellæ	149
161, 162.	Patella	149
163	Head of Tibia	151
164	Callus: Fractured Femur	151
165	Tibia and Fibula. Shafts: Bee-de-Flûte	151
166	Fibula. Shaft	151
167	Tibia: Shaft. Greenstick	153
168	Tibia and Fibula. Supramalleolar	153
169, 170	Pott's Fracture	153
171, 172	Pott's Fracture	155
173	Os Calcis	155
174	Fractured Metatarsal	155
175	Marching Fracture	155
176	Fracture. Astragalus	157

FRACTURES—*continued*

FIGURE		PAGE
177	Fracture Humerus	157
178	Metatarsals Second and Third	159
179	External Sesamoid of Great Toe	159
180	Hallux Proximal Phalanx	159
181	Great Toe Untreated	159
182	Separated Lower Epiphysis of Humerus	161
183	Separated Lower Epiphysis of Humerus After Treatment	161
184	Excessive Callus on Ulna	161
185	Callus on Ulna	161
186	Plating of Tibia	163
187	Plating of Humerus	163
188	Band on Humerus	163
189	Wiring of Fracture	163
190	Plating of Femur	165
191 102	Bone Graft Tibia	165
193 194	Callus on Radius and Ulna	167
195	Separated Epiphysis of Humerus Supracondylar Process Immediate	167
196	" 10 days later	167
197	" 10 "	167
198	" 23 "	169
199	" 23 , "	169
200	" 44 "	169
201	" 44 "	169
202	" 1 1/4 years later	169
203	" 1 1/2 "	169
204	False Joint Tibia and Fibula	171
205	Vicious Union of Clavicle	171
206	Non Union of Radius	171
207	Cross Union	171
208	Atrophy of Bone	173
209	Necrosis	173
210	Spur	173
211	Atrophy of Covering	173

DISEASES OF BONES

212	Atrophy of Tarsus	175
213	Atrophy of Finger Rheumatoid Arthritis Gout	175
214	Atrophy of Foot (Charcot's)	175
215	Atrophy of Tibia and Fibula	175
216	Syphilitic Metacarpal	177
217	Periosteal Whitlow	177
218	Tuberculous Dactylitis	177

DISEASES OF BONES—*continued*

		PAGE
219	Syphilitic Metacarpals	177
220.	Pyogenic Dactylitis	177
221	Tuberculous Metacarpal: "Coffin Bone"	177
222, 223	Sound and Tuberculous Knees	179
224	Tuberculous Knee	179
225	Necrosis of Metacarpal	181
226	Myeloma of Phalanx	181
227.	Congenital Syphilis of Humerus and Ulna	181
228	Os Vesali	181
229.	Osteoma of Metacarpal	181
230.	Tuberculous Periostitis	181
231	Periostitis of Metatarsal	181
232.	Tertiary Syphilis	183
233	Tertiary Syphilis	183
234.	Congenital Syphilis of Ulna	183
235	Chronic Osteomyelitis of Femur	185
236	Acute Osteomyelitis of Fibula with Necrosis	185
237, 238	Acute Osteomyelitis	185
239	Acute Osteomyelitis of Tibia	187
240	Chronic Osteomyelitis of Humerus	187
241	Abscess of Radius: Foreign Body	189
242	Tuberculous Abscess of Radius	189
243.	Brodie's Abscess of Tibia	189
244	Abscess of Tibia	189
245	Abscess of Tibia	191
246	Epiphysitis—Trochanter	191
247	Atrophy of Bones of Leg and Foot	191
248	Osteomyelitis	191
249	Paget's Quiet Necrosis	193
250	Schlotter's Disease	193
251	End Results of Osteomyelitis in Tibia	193
252	End Results of Osteomyelitis in Ulna	193
253	Kummel's Disease	195
254	Chronic Osteomyelitis and Periostitis of Humerus	197
255	Tuberculous Radius	197
256	Arrested Tuberculous Spine: Bone Grafts	199
257	Spinal Tuberculosis	199
258	Spinal Tuberculosis	199
259	Spinal Tuberculosis	199
260	Syphilitic Periostitis of Tibia	201
261	Syphilitic Periostitis of Ulna	201
262	Syphilitic Periostitis of Tibia	201

DISEASES OF BONES—*continued*

FIGURE		PAGE
263	Typhoid Abscess of Tibia	201
264	Spondylitis Deformans	203
265	Scoliosis	203
266	Rheumatic Fever	203
267	Calcified Spinal Abscess	203
268	Kyphosis	205
269-272	Rickets Effect of Ultra Violet Rays on	207
273	Rickets Cured	209
274	Rickets of Tibia and Fibula	209
275	Rickets of Radius and Ulna	209
276	Traumatic Scoliosis	211
277	Hallux Valgus	213
278	Pes Cavus	213
279	Pes Planus	213
280	Partial Separation of the Tibial Epiphysis	213
281	Fragilitas Ossium	213
282	Cyst of Femur	213
283	Cyst of Neck of Femur	213
284	Osteogenesis Imperfecta	217
285	Leontiasis Ossium	217
286	Osteitis Maxilla and Mandible	217
287	Spinal Tuberculosis	219
288	Paget's Disease of Skull	219
289	Paget's Disease of Spine	219
290	Varicose Ulcer Bone Changes of	219
291	Osteitis Deformans Early Spontaneous Fracture	221
292	Osteitis Deformans of Tibia (Late)	221
293	Osteitis Deformans Fractures	221
294	Spondylitis Deformans	223
295	Spondylitis Osteo Arthritica	223
296	Spondylitis Deformans	223
297	Osteo Arthritis Spine	223
298	Spondylolisthesis	225
299	Chronic Syphilitic Osteo Periostitis	225
300	Acute Osteomyelitis	225
301	Necrosis of Mandible	225
302	Osteitis Deformans of Ulna	227
303	Osteomalacia of Femur	227
304	Osteomalacia of Hind	227
305	Achondroplasia	229
306 307	Achondroplasia	231
308	Osteitis Fibrosa	231
309	Syphilitic Epiphysitis	231

DISEASES OF BONES—*continued*

FIGURE		PAGE
310	Osteomyelitis Humerus	233
311, 312	Osteomyelitis Femur	233
313-315	Fibrocystic Disease. Stages of	235
316.	Syphilitic Periostitis	235
317.	Madelung's Deformity	237
318	Köhler's Disease (Early)	237
319	Köhler's Disease (Late)	237

TUMOURS OF BONE

320	Diaphyseal Aclasia	239
321	Exostosis of Scapula	239
322, 323	Subungual Exostosis	239
324	Myeloma Mandible	241
325.	Ivory Exostosis	241
326	Osteoma Humerus	241
327.	Myeloma	241
328, 329.	Osteogenic Sarcoma	243
330	Enchondroma	243
331.	Enchondromata of Hand	245
332	Calcified Enchondroma	245
333	Enchondroma of Ulna	245
334.	Enchondroma of Foot	245
335	Chondroma	245
336	Endosteal Sarcoma	247
337.	Sarcoma	247
338	Endosteal Sarcoma	247
339.	Metastatic Mammary Carcinoma	247
340.	Periosteal Sarcoma of Femur	249
341	Myeloma of Femur	249
342	Osteoma of Humerus	249
343	Periosteal Sarcoma	249
344	Sarcoma of Scapula	251
345	Intra-medullary Sarcoma of Tibia	251
346	Osteoma of Radius	251
347	Myeloma of Humerus	251
348	Primary Sarcoma of Skull	253
349	Secondary Sarcoma of Skull	253
350	Metastatic Hypernephroma in Femur	255
351	Metastatic Ovarian Carcinoma in Femur	255
352	Diaphyseal Aclasia	255
353	Periosteal Sarcoma (Early)	255

TUMOURS OF BONE—*continued*

FIGURE		PAGE
354 355	Sarcoma Ilium	257
356-358	Carcinoma Metastatic	257
359	Chondroma Spine	259
360	Carcinoma Spine and Skull	259
361	Mylomatosis	259

INJURIES AND DISEASES OF JOINTS

362 363	Dislocation of Clavicle	261
364 365	Dislocation of Elbow	261
366	Dislocation of Radius	263
367	Dislocation of Metacarpal	263
368	Dislocation of Wrist	263
369	Dislocation of Phalanx	263
370	Dislocation of Thumb	263
371	Separated Epiphysis of Femur	265
372	Dislocation of Hip	265
373	Fracture Dislocation of Ankle	265
374	Sacro Iliac and Symphysis Fracture	265
375	Fracture Dislocation of Thumb	265
376	Fracture Dislocation of the External Femoral Condyle	267
377	Dislocation of Ankle	267
378	Old tarsal Dislocation	267
379	Dislocation of Hallux	267
380	Gunshot Wound of Wrist	269
381	Syphilitic Synovitis of Knee	269
382	Septic Arthritis of Wrist	269
383	Arthritis of Knee	269
384	Tuberculous Shoulder Caries Sicca	271
385	Tuberculous Wrist	271
386 387	Tuberculous Elbow	271
388	Tuberculous Ischium	273
389	Tuberculous Ilium	273
390	Tuberculous Hip Pathological Dislocation	273
391	Tuberculous Hip Treated	273
392	Tuberculous Hip Wandering Acetabulum	275
393	Tuberculous Hip Healed	275
394	Tuberculous Hip Ankylosis	275
395	Tuberculous Hip	275
396 397	Tuberculous Knee	277
398	Tuberculous Knee	279
399	Hallux Rigidus	279

INJURIES AND DISEASES OF JOINTS—*continued*

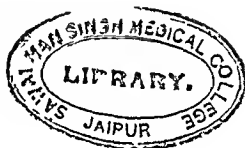
FIGURE		PAGE
400.	Gout	279
401.	Tuberculous Knee. Child	281
402.	Tuberculous Knee Active	281
403.	Tuberculous Knee: Starting in Tibia	281
404.	Tuberculous Knee	281
405.	Tuberculous Cavity in the Os Calcis	283
406.	Tuberculous Os Calcis	283
407, 408.	Tuberculous Tarsus	283
409, 410.	Charcot's Hip	285
411, 412.	Charcot's Elbow: Syringomyelia	285
413, 414.	Tuberculous Sacro-Iliac Joint	287
415.	Congenital Dislocation of Hip	287
416.	Coxa Vara	289
417.	Congenital Dislocation of Hip	289
418.	Pseudo-Coxalgia (Legge-Calvé-Perthe's Disease)	289
419.	Healed Pseudo-Coxalgia	289
420.	Osteo-Arthritis of Hip	291
421.	Osteo-Arthritis of Knee	291
422.	Rheumatoid Arthritis	291
423.	Excision of Wrist	293
424.	Excision of Elbow	293
425.	Excision of Knee. Ankylosis	293
426.	Excision of Knee	293

NASAL SYSTEM

427.	Normal Frontal Sinus	294
428, 429.	Normal Antrum	294
430.	Normal Sphenoidal Sinus	294
431.	Frontal Sinusitis	297
432.	Left Frontal Sinusitis	297
433, 434.	Antrum (Suppuration)	297
435.	Ethmoidal Sinusitis	299
436.	Maxillary Antrum	299
437.	Sarcoma of Maxilla	299
438.	Tumour of Left Orbit	300
439.	Normal Nasal Sinuses	300
440, 441.	Normal Antrograms	300
442.	Pathological Antrogram	303
443.	Normal Mastoid	303
444.	Suppurating Mastoid	303
445, 446.	Chronic Mastoid	303

DENTAL SYSTEM

FIGURE		PAGE
447	Normal Lower Molars	305
448	Normal Teeth at Age of 6	305
449-450	Pyorrhœa Alveolaris	305
451-456	Dental Sepsis and Constitutional Disease	305
457	Senile Regression of Alveolus	307
458	Pyorrhœa Alveolaris	307
459	Apical Abscess	307
460	Fractured Interdental Spine	307
461	Apical Abscess	307
462	Misplaced Unerupted Canine	307
463	Chronic Periodontitis	307
464	Unerupted Canine Immature Apices	307
465	Alveolar Abscess	309
466	Cementoma	309
467	Buried Roots	309
468	Pyorrhœa and Periodontitis	309
469	Chronic Pyorrhœa	309
470	Senile Attrition of Tooth	309
471	Chronic Abscess	309
472	Apical Abscess	309
473	Crowned Teeth	311
474-475	Periapical Abscess	311
476	Cementoma	311
477	Pulp Stones	311
478	Residual Infection Mandible	311
479	Normal Edentulous Mandible	311
480	Caries in First and Second Molars Impaction of Third	311
481	Healing Tooth Socket	311
482	Interstitial Caries	311
483	Apical Abscess—Marble Bone	313
484	Periapical Cyst	313
485	Pyorrhœa Alveolaris	313
486	Cementoma	313
487-489	Apical Abscesses	313
490	Misplaced Premolar	313
491	Periapical Abscess	315
492	Impacted Wisdom Tooth Buried Roots	315
493	Atrophied Periodontal Membrane	315
494	Interproximal Radiograph	315
495	Dental Cyst	315
496	Accessory Teeth	315
497	Dentigerous Cyst	317



DENTAL SYSTEM—*continued*

FIGURE		PAGE
498.	Impacted Teeth	317
499.	Impacted Third Molar	317
500.	Alveolar Abscess	317
501.	Impacted Canine	317

ALIMENTARY SYSTEM

502	Normal Oesophagus	318
503.	Normal Stomach—Immediate	318
504.	Normal Stomach— $\frac{1}{2}$ Hour	318
505.	Normal Stomach— $\frac{1}{2}$ Hour	318
506-511.	Normal Opaque Meal	320
512.	Normal Stomach and Duodenum—1 Hour	322
513.	Normal Meal— $\frac{1}{2}$ Hour	324
514.	Normal Stomach—1 Hour	324
515.	Normal Stomach and Intestine—2 Hours	324
516.	Normal Meal—2 $\frac{1}{2}$ Hours	324
517-519.	Normal Gastric Mucosa	326
520.	Normal Colon	328
521.	Normal Colon	330
522.	Normal Colon	330
523.	Normal Small and Large Intestines	330
524.	Mass Peristalsis of Colon	330
525.	Pharyngeal Diverticulum	333
526.	Pharyngeal Diverticulum	333
527. 528.	Pharyngeal Diverticulum	333
529.	Pharyngeal Diverticulum	335
530.	Oesophageal Stricture	335
531.	Congenital Absence of Lower Oesophagus	335
532.	Salivary Calculus	337
533	Salivary Calculus • Ossified Stylo-Hyoid Ligament	337
534. 535.	Cardiospasm	337
536. 537	Carcinoma Oesophagus—Intubation	339
538	Carcinoma Oesophagus	339
539.	Carcinoma of Oesophagus	339
540.	Cancer Oesophagus	341
541.	Foreign Body in Oesophagus	341
542.	Gastric Ulcer	341
543.	Spasmodic Hourglass Stomach	341
544-545	Gastric Ulcer	345
546	Gastric Ulcer	345
547-550.	Gastric Ulcer	347

ALIMENTARY SYSTEM—*continued*

FIGURE		PAGE
551	Recurrent Gastric Ulcer	349
552, 553	Gastric Ulcer	351
554	Ulcer with Hourglass Stomach	353
555	Gastric Ulcer	353
556	Perigastritis Tuberculosis	353
557	Gastric Papillomatosis	353
558	Gastric Carcinoma	355
559	Carcinomatous Gastric Ulcer	355
560	Gastric Carcinoma	357
561	Gastric Cancer	359
562	Malignant Gastric Polypus in Young Subject	359
563 564	Carcinoma of the Cardia	361
565 566	Gastric Carcinoma	361
567	Gastric Carcinoma	363
568-570	Gastric Carcinoma and Simple Ulcer	363
571	Carcinoma Cardia	365
572-574	Gastric Carcinoma	365
575	Pyloric Carcinoma	367
576	'Leather Bottle' Stomach	367
577	Gastric Carcinoma	367
578	Mesenteric Cyst	367
579 580	Congenital Pyloric Stenosis	369
581 582	Congenital Pyloric Spasm	369
583-586	Pyloric Spasm	371
587	Duodenal Ulcer	373
588	Duodenal Ulcer	375
589	Duodenal Ileus	375
590	Duodenal Ulcer	375
591	Distortion of Duodenum	375
592 593	Duodenal Ulcer	377
594	Jejunal Ulcer Duodenal Ileus	379
595-597	Gastric Ulcer Chronic	379
598	Gastro Enterostomy for Duodenal Ulcer	381
599	Duodenal Ileus	381
600 601	Gastro Enterostomy	381
602	Gastrectomy	383
603, 604	Jejunal Ulcer	385
605	Jejunal Obstruction	385
606	Perforated Duodenal Ulcer	385
607	Duodenal Diverticulum	387
608	Duodenal Ileus	387
609 610	Gall Stones	387
611-616	Intestinal Obstruction	389

ALIMENTARY SYSTEM—*continued*

FIGURE	PAGE
617-620. Gall-Stones	391
621, 622 Gall-Stones	393
623. Biliary and Renal Calculi	395
624, 625. Gall-Bladder. Normal	396
626 Large Gall-Bladder	396
627. High Gall-Bladder	396
628-631. Gall-Bladder	399
632. Small Gall-Bladder	401
633 Ptoed Gall-Bladder	401
634. Adhesion of Gall-Bladder	401
635 Gall-Stones	401
636-639. Gall-Stones	403
640, 641. Shot in Appendix	405
642, 643. Appendicitis	405
644, 645. Chronic Appendicitis	405
646-654 Chronic Appendicitis	407
655. Ulcerative Colitis. Dysentery	409
656-659 Colitis	411
660. Carcinoma Sigmoid	413
661, 662. Carcinoma Cæcum	415
663. Carcinoma of Sigmoid	415
664 Carcinoma Prostate Diverticulosis	415
665. Intussusception	417
666-668 Carcinoma Colon	417
669 Carcinoma of Sigmoid	419
670 Carcinoma Colon	419
671. Carcinoma of Sigmoid	419
672. Transposition Viscera	421
673-674 Diverticulitis	421
675-676 Diverticulosis	423
677-680 Diverticulosis	425
681. Diaphragmatic Hernia	427
682 Subphrenic Abscess	429
683 Mesenteric Cyst	429
684 Intestinal Obstruction	429
685 Hirschsprung's Disease	429
686 "Cup and Spill" Stomach	431
687-690 Pancreatic Calculi	433
691 Foreign Body in Duodenum	433
692. Foreign Body in Ileum	433
693 Foreign Body in Colon	433
694 Corn in Colon	433

URINARY SYSTEM

FIGURE		PAGE
695	Normal Excretion Urograph	434
696	Normal Excretion Pyelograph Gall Stones and Calcified Clands	436
697	Phleboliths	438
698	Normal Pyelograph	438
699 700	Calcified Glands (A P and P A)	438
701	Remains of Opaque Meal	440
702	Phlebolith	440
703	Phleboliths	440
704	Normal Cystograph	440
705-707	Renal and Ureteral Calculi	443
708	Renal Calculus	445
709	Renal Calculus and Sand	445
710, 711	Renal Calculi	445
712-715	Renal Calculus	447
710 717	Renal Calculus	449
718	Renal Calculi	449
719	Renal Calculus	449
720	Hydronephrosis and Hydroureter	451
721	Dilatation of Ureter	451
722	Accessory Renal Artery	451
723	Tuberculous Kidney	451
724-725	Hydronephrosis	453
726	Accessory Renal Artery	453
727	Hydronephrosis	453
728	Bilateral Hydronephrosis and Hydroureters	455
729	Double Ureter and Kidney	455
730 731	Extra Renal Tumour	455
732	Floating Kidney	457
733	Horseshoe Kidney	457
734	Congenital Cystic Kidney	457
735	Extra Renal Tumour	457
736 737	Floating Kidney	459
738	Hydronephrosis	459
739	Floating Kidney	459
740	Pyelonephritis Right	461
741	Polycystic Disease	463
742	Hypernephroma	463
743-746	Hypernephroma	463
747 748	Tuberculous Kidney	467
749 750	Cancer of Kidney	467
751 752	Ureteral Calculi	469
753	Ureteral Calculus	469



URINARY SYSTEM—continued

754	Ureteral Calculi	169
755-757	Vesical Calculi	171
758.	Vesical Calculus	171
759	Carcinoma Bladder	173
760.	Vesical Pouches	173
761.	Prostatic and Urethral Calculi	173
762.	Carcinoma Bladder	173
763.	Foreign Body in Bladder	175
764.	Pin in Prostate	175
765	Urethral Calculus	175
766	Penile Calculus	175

RESPIRATORY SYSTEM

767	Normal Chest (Age 11)					176
768.	Normal Chest (Age 14)	.	.	.	.	176
769.	Normal Chest (Age 30)	.	.	.	.	176
770.	Normal Chest (Age 50)	.	.	.	.	176
771.	Normal Chest (Age 20)	.	.	.	.	178
772	Scale for Hilar Markings	.	.	.	.	178
773.	Acute Miliary Tuberculosis	.	.	.	.	181
774.	Active Tuberculosis	.	.	.	.	183
775.	Arrested Tuberculosis	.	.	.	.	185
776-779	Early Tuberculosis - A P T. Cure	.	.	.	.	187
780	Early Tuberculosis	.	.	.	.	189
781.	Azygos Lobe	.	.	.	.	189
782.	Early Tuberculosis	.	.	.	.	189
783.	Acute Tuberculosis	.	.	.	.	189
784	Spontaneous Pneumothorax	.	.	.	.	191
785.	Artificial Pneumothorax	.	.	.	.	191
786.	Hydatid, Lung	.	.	.	.	191
787	Artificial Pneumothorax - Phrenic Evulsion	.	.	.	.	191
788-791.	Tuberculous Pleurisy	.	.	.	.	193
792, 793	Bronchiectasis	.	.	.	.	195
794.	Pyothorax Pneumonia	.	.	.	.	197
795-798	Bronchiectasis - Laprodol	.	.	.	.	199
799-801	Acute Lobar Pneumonia	.	.	.	.	501
802	Bronchopleural Fistula	.	.	.	.	501
803	Spontaneous Pneumothorax	.	.	.	.	503
804	Active Tuberculosis	.	.	.	.	505
805	Chronic Tuberculosis	.	.	.	.	505
806	Emphysema	.	.	.	.	505
807	Pulmonary Spermatozois Castellani	.	.	.	.	505

RESPIRATORY SYSTEM—continued

FIGURE		PAGE
808 809	Basal Phthisis Phrenic Evulsion	507
810, 811	Result of Thoracoplasty	507
812-819	Artificial Pneumothorax	509
820-825	Artificial Pneumothorax	511
826 827	Phthisis Phrenic Evulsion	513
828, 829	Artificial Pneumothorax Phrenic Evulsion	513
830, 831	Massive Phthisis Phrenic Evulsion	515
832 833	Artificial Pneumothorax Mediastinal Flop and Hernia	515
834-837	Artificial Pneumothorax Mediastinal Flop and Hernia	517
838-841	Thoracoplasty	519
842 843	Fibrin Ball Artificial Pneumothorax	521
844	Unresolved Pneumonia	521
845	Interlobar Empyema	521
846	Unresolved Empyema	523
847	Lung Abscess	523
848	Carcinoma Lung	525
849	Carcinoma Lung	525
850	Sarcoma following Phthisis	525
851	Carcinoma Lung	525
852 853	Empyema Foreign Body	527
854 855	Carcinoma Pleural Effusion Gas Replacement	527
856	Mediastinal Lymphadenoma	529
857	Lymphadenoma	529
858	Carcinoma Lung	531
859, 860	Carcinoma Lung	533
861	Sarcomatosis Lung	533
862	Dermoid Cyst of Chest	533

NERVOUS SYSTEM

863-865	Lipiodol Injections Normal Theca	535
866-872	Spinal Tumour	535
873 874	Meningitis	537
875	Encephalography Lipiodol Ascending	537
876 877	Tuberculous Abscess	537
878	Seritis	537
879	Hydrocephalus	539
880 881	Lumbar Spina Bifida	541
882	Cervical Spina Bifida	541
883	Encephalocele	541
884	Chromophobe Pituitary Adenoma	543
885	Anterior Basal Meningioma	543
886	Chromophobe Pituitary Adenoma	545

NERVOUS SYSTEM—*continued*

FIGURE		PAGE
887	Anterior Basal Meningioma	515
888.	Eosinophil Pituitary Adenoma	517
889.	Left Parasagittal Meningioma	517
890.	Cranio-pharyngioma	519
891, 892.	Calcified Glioma	519
893-895.	Meningioma of Vault	551
896, 897.	Meningioma of Base	553
898	Pinealoma	553
899.	Acoustic Neuroma	555
900.	Supracallosal Epidermoid	555
901	Angioblastoma	557
902	Osteitis Fibrosa Cystica	557
903	Oxycephaly. Lateral	559
904.	Oxycephaly: Antero-Posterior	559
905	Localisation of Trephinnings	560
906, 907.	Jacksonian Epilepsy	563

VASCULAR SYSTEM

908.	Aneurism Heart	565
909	Aneurism Aorta	565
910	Mitral Stenosis	565
911	Pericardial Effusion	567
912.	Aneurism. Aorta	567
913	Thoracic Aneurism	567
914.	Aneurism	567
915, 916.	Calcification of Arteries	569
917.	Rupture of Sclerosed Artery	571
918.	Nævus of Chest	571
919	Gout	571
920.	Mönckeberg's Sclerosis	571

DUCTLESS GLANDS

921.	Branchial Sinus	573
922	Thyroglossal Sinus	573
923	Branchial Sinus	575
924.	Thyroglossal Sinus	575
925, 926	Thyroglossal Cyst	577
927.	Substernal Goitre	577
928	Adenoma Thyroid	577
929	Band of Urdarm	579
930, 931	Retro-sternal Goitre	579

LIST OF ILLUSTRATIONS

viii

FEMALE GENERATIVE SYSTEM

FIGURE		PAGE
932	Fibroma of Uterus	381
933	Calcified Fibroid of Uterus	381
934	Ovarian Cyst	381
935	Fallopian Tubes and Uterus (Ispidol)	381
936	Fœtal Death	383
937	Early Pregnancy	383
938	Normal Pelvis	383
939	Small Pelvis	383
940	Flattened or Platypeloid Pelvis	383
941	Anthropoid Pelvis	383
942	Position for Pelvimetry	382
943	Breech Presentation	385
944	Hydrocephalus in Utero	385
945	Twins	385
946	Quadruplets	385
947	Anencephalus in Utero	387

MUSCLES

948	Myositis Ossificans	389
949	Myositis Ossificans in Brachialis Anticus	389
950	Myositis Ossificans in Rectus Abdominis	389
951	Ossification of Interosseous Septum	389
952	Myositis Ossificans of Vastus Internus	389
953	Myositis Ossificans	389

MEDICO LEGAL

954	Cleido Cranial Dysostosis	391
955	Myositis Ossificans	391
956	Congenital Syphilis	393
957	Glass in Prepatellar Bursa	393
958	Injury in Osteoarthritic Knee	393
959	Os Acetabuli	393

EMBRYOLOGY

960	Fœtulo—C—R 23 mm	395
961	Fœtulo—C—R 23 mm	395
962	Fœtulo—C—R 42 mm	395
963	Fœtulo—C—R 42 mm (photograph)	395
964	Fœtulo—C—R 88 mm	395

EMBRYOLOGY—*continued*

FIGURE		PAGE
965.	Fœtus—C.—R. 89 mm.	595
966.	Fœtus—C.—R., 92 mm	595
967.	Fœtus—C.—R., 112 mm.	597
968.	Fœtus—C.—R., 140 mm	597
969.	Fœtus—C.—R., 146 mm.	597
970.	Anencephalus	597

ANTHROPOLOGY

971.	Pelvis of Cheddar Cave Man	599
972.	Plesiosaurus Bones in Slate	599

HELMINTHOLOGY

973, 974.	Cysticerci	601
975, 976.	Hydatids of Lung	601

OCCUPATIONAL DISEASES

977.	Asbestosis	603
978.	Silicosis : Tuberculosis	605
979	Occupational Osteo-Arthritis	605

RADIO-DIAGNOSIS

"Use your eyes and your fingers, sometimes your nose, very seldom your ears"

THESE words of Sir James Paget in *Clinical Essays* (1875) ring particularly true in the case of Radiology, but why is this science, for it is more than an art, still the Cinderella of British Medicine? It is possible for general practitioners to obtain teaching in any ancillary of Medicine except Radiology. As a result of this lack of teaching the general practitioner does not know what cases are suitable for X ray examination and how it can help him in his daily round. Therefore when he gets a puzzling case, as a last resort, he sends it to a radiologist. If he fails to establish a diagnosis, scorn is poured on one of the most accurate methods we possess.

All will agree that the greatest, if not the only, opportunity of eliminating disease rests on an early diagnosis. Radiology can often establish an earlier diagnosis in the case of internal surgical disease than any other method, moreover it can confirm and give precision to diagnosis made by other means. Further, Radiology has this unique feature **AN EXACT RECORD IS OBTAINED FOR COMPARATIVE PURPOSES IN THE COURSE OF DISEASE**, whereas with other methods it is often only possible to record impressions.

Few general practitioners have time or inclination to possess an X ray plant, though those who do, find it invaluable in the study of the course of disease. They know and live among the patients, and often do useful work based, as all Medicine should be, on clinical grounds. There should be no excuse, such as there is, for the practitioner not knowing what Radiology can reveal to him. There is a welcome trend amongst the specialist consultants—*i.e.* those dealing with one system of the body—to diagnose their own radiographs, and who could be better fitted, since they have all the clinical facts at hand? All the outstanding advances of recent years have been made by such men. Sieard introduced hipiodol, Dandy produced the first ventriculograph, Von Lichtenberg prepared the first excretion pyelograph. **Grahame and Cole, at**

Rowntree's suggestion, made the first cholecystograms. In the non-teaching hospitals and small hospitals which are not in a financial position to carry a radiologist it is imperative that the staff do their own interpretation, and where can they obtain teaching of a non-technical nature to enable them to do this?

CANCER CAMPAIGN

ONE by one, a remedy is being found for all diseases, even tuberculosis is proving amenable to treatment, but cancer holds out as the one affliction which shows an increase. Doubtless some of this increase is due to improved methods of diagnosis, also to the fact that the expectation of life is increasing, and as it is usually a disease affecting people at or past middle life there are more subjects available. Large funds are being collected in connection with the British Empire Cancer Campaign. To celebrate the late King George V's happy recovery in 1929, £100,000 out of £250,000 was collected from the nation for the purchase of radium, yet this element was not used in his diagnosis or treatment, the public apparently considering Radium and Radiology synonyms. While the results of radium for oral and skin conditions are magnificent, and radium needles have a wide field of usefulness, the results would not appear to justify the expenditure of so much money when its place can often be taken by X-rays in their various forms.

Why has not the approach to the problem been along the line of earlier diagnosis? Every surgeon will admit that, provided the disease is recognised at its outset, cancer is very amenable to the knife. Now the alimentary tract is the commonest site for cancer, it is eminently suitable for X-ray examination, and in most of its extent it is accessible to operation. In view of these three facts, why is the general practitioner taught the late symptoms, or rather they are complications, of abdominal cancer, instead of the early ones, which can be confirmed by Radiology with little expense, trouble, or pain compared with those of a laparotomy?

X-RAY MUSEUM

THE establishment of a Radiographic Museum would at once vitalise the science and take from it the shrouds of mystery and place it in the

realms of reality It would provide a meeting-place where students and post graduates could resort, as they do to the museums of the Colleges of Surgeons and Medical Schools Practitioners should be able to interpret films with the same ease with which they do museum-bottled specimens, looking to the radiologist's report, as they do the museum catalogue, for confirmation After all, in the case of most opaque media preparations, the finished print is merely a photograph of a condition with which they are familiar and bears no relation to physics or electricity If doctors could see such a collection of prints accompanied by descriptive, clinical and microscopic notes, and where possible specimens in jars and models, the whole science would be brought to life—it would truly be the *Pathology of the Living* From such a centre prints and models could be distributed to the general museums So far as the writer is aware, no such museum exists at present in the world, so that now appears the time for Britain to come to the fore again It is surprising that the radiologists themselves have no museum for their own training, a few radiographs of foreign bodies, curiosities and gross malignant disease can hardly be said to constitute a museum The only place where radiographs can be seen in their proper perspective—*i.e.* alongside specimens, clinical notes and microscopical findings—is in the Wellcome Museum of Medical Sciences, Euston Road, London But this does not profess to be an X-ray museum A cine film of movements of the alimentary canal would be of great assistance, the difficulty is not insurmountable, merely financial

Research has been most difficult in the past owing to lack of funds here, though other countries have forged ahead, America had a Research Centre as early as 1930

Without going into the question of technique, which is best left in the hands of those who show an aptitude for the subject, short intensive courses could be given to post graduates The lay public consider an X-ray examination represents the acme of diagnosis Properly done and in suitable cases this is true, and it is a duty the profession owes the public to see that the patient gets the full measure of benefit from this important auxiliary of Medicine



THE CLINICAL APPLICATION OF RADIOLOGY

THE origin and nature of X-radiations have been fairly well cleared up. They are ether vibrations similar in every respect to visible light, but of very considerably shorter wave-length. They are produced by the sudden change of speed or direction of motion of a fast electron. Whilst this knowledge has been gained only comparatively recently, the fruits of the application of X-rays to diagnosis have accumulated since their discovery. They are the result of years of empirical work and experience. X-rays are generated when an electric current at high voltage is passed from one electrode to another in a vacuum. The passage of the current from the cathode to the anode in the form of what are known as "cathode rays" causes the production of X-rays when the electrons of which the cathode rays are composed are stopped by the anticathode. X-rays are a part of that large spectrum of electro-magnetic vibrations of which the visible spectrum is a very small portion. They are invisible to our eyes, but are capable of exciting fluorescence in certain salts, such as barium-platino-cyanide, calcium tungstate, etc., and of acting on a photographic film as does ordinary light. They penetrate most kinds of matter, but some substances are more opaque than others. This difference in the absorption by rays of various kinds of matter causes shadows, and these form the basis of X-ray diagnosis.

The depth of these shadows depends on—

(1) The density of the substance radiographed. The degree of absorption is determined largely by the density of the substance and the atomic weight of the elements of which it is composed. Bone is relatively opaque by virtue of its high calcium content, as also are some urinary and, to a less extent, biliary calculi. Bismuth and barium have high atomic weights, and insoluble salts of these metals are used for opaque meals. Of late barium sulphate alone is employed, for reasons of economy. Iodine and bromine salts soluble in water and oil are used for work on the urinary tract, the bronchial tree and the cerebrospinal system.

(2) The wave-length of the X-rays generated. The wave-length of

the rays varies inversely with the kilovoltage which generates them, thus the higher this voltage the shorter is the wave length. The penetrating power of the rays again varies with the wave length, and increases as the wave-length decreases. As a general rule, a comparatively long wave radiation is used for diagnosis. The longest waves are employed for work on

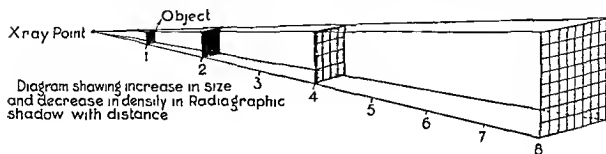


FIG 1

extremities, and also for chests, gall stones, etc., where a very fine differentiation of processes almost equally opaque to rays is required. Somewhat harder radiation must be employed for the thicker parts of the body.

(3) The farther the film is from the anticathode the less, according to the inverse square law, is the intensity of the radiation which reaches it. A body interposed between the two casts a shadow, but if the intensity which reaches the part of the film which is not under the shadow is small, then the depth of the shadow cast—that is to say, the difference between the degree of exposure of that part of the film which is under the shadow and that which is not—becomes small. When, therefore, the distance between the focus and the film is great the intensity of the radiation must be large whilst when it is small the intensity can be kept low.

W E SCHALL

X-RAYS IN THE DIAGNOSIS OF INTERNAL DISEASE

Introduction.—In surgery three names stand out far beyond all others. First, the great John Hunter (1728-93), who laid the foundations of surgery as we know it to-day. Secondly, Lord Lister, who, with Pasteur's help, introduced us to antiseptics, without which modern surgery could not exist. He was born almost on the hundredth anniversary of Hunter's birth, and died in 1919. (Astley Cooper records his misgivings on being asked to deal with so simple a thing as the removal of a wen from George IV's head in 1820.) Thirdly, a shy, hitherto unknown, but brilliant German physicist, Roentgen, helped by Crookes. It is passing strange that a non-medical should have stumbled across the medical use of X-rays, still more so that their use in crystallography and in the detection of flaws in metals, etc., should have received attention so much later. In the early days of X-rays Britain led the way, then came a long period in which she was in the shade of U.S.A., Sweden, Germany and Austria. Now Britain is coming to the fore once more.

Nature of Rays.—X-rays are akin to light, but of shorter wave-length. Like light they are capable of penetrating certain substances and being arrested by others, not by any means the same, however, thus black paper and aluminium is opaque to light but radiolucent, lead glass is transparent to light, opaque to X-rays. Generally, the heavier the metal the more opaque it is.

X-rays are generated when cathode-rays are suddenly arrested at an anti-cathode. Cathode-rays are developed when an electric current of high voltage is passed between cathode and anode in a high degree of vacuum. It is on the varying densities that diagnoses are made according to this law: "X-RAYS PENETRATE DIFFERENT MEDIA TO VARYING DEGREES, THUS SHADOWS OF VARYING DENSITIES ARE CAST." They are able to evoke fluorescence in certain salts and so become visible, otherwise, they are not seen by the naked eye, they act on photographic films as does light. They are stopped by bone, resulting in a shadow being cast; water is more opaque than air, thus they are of service in study of the lungs and in certain intestinal diseases. Metals of high atomic weight, i.e. heavy substances such as barium, bismuth and iodine, are very radio-opaque and are used in filling the hollow organs.

Long ago there was a slight risk to the patient from burning, but it was only slight; on the other hand, there was a very definite risk to the operator who would put his hand in the path of the rays to test their penetration. This caused dermatitis and ulceration which passed on to cancer. (Paradoxical as it may seem, X-ray and radium are used in their treatment.) The late Dr. Orton and Dr. Robson were recent sufferers. Occasionally one hears of patient and operator receiving shocks, but

this is very rare. In the past, with the exception of pathologists who not infrequently succumb to cuts received in the post mortem room radiologists and radiographers have suffered more casualties than any other medical men.

In the present state of our knowledge—or rather ignorance—of cancer X-rays offer the best hope of success since by their means an earlier diagnosis of internal disease is possible than with any other method. Cancer can be removed before it has taken root—that is before it has infiltrated locally and been disseminated to a distance. The signs and symptoms given in the older text books have had to be revised since they were either those of complications or of inoperability.

Methods of Examination—There are three ways of examining a hollow organ.

1 Plain or straight X-ray

This is the only method used in the case of the bones which contain large amounts of calcium. It is valuable in study of urinary, gall and salivary stones and in the detection of calcium deposits in tuberculosis and tumours, particularly those of the brain. It is of equal service in demonstrating the difference between œdema or fluid and air in tuberculous lungs and in pneumothorax. It reveals the presence of fluid levels in cases of intestinal obstruction.

2 The introduction of a radio opaque substance into the hollow organ

Two methods of doing this are used.

(a) *Filling the organ*—This is of service for the stomach by giving 10 oz. of barium sulphate meal when the interior of the organ is visualised as a sort of cast for the colon when an opaque enema is administered for the urinary, nervous and bronchial systems when an iodine preparation is used.

(b) *Whitewashing the interior*—This is used with advantage in study of the stomach and colon. 1½ oz. of radio opaque meal is introduced and massaged so that the lining of these organs can be visualised. It is complementary to the other method but requires more time and patience.

3 The active excretion of the radio opaque medium

This method is used in the investigation of gall bladder and kidney conditions.

Diagnosis or Treatment—Radiology as a science is sharply divided into diagnosis and treatment. So distinct is the difference between these two that men are found specialising in one or the other branch.

Taking the different organs or cavities which are available for study we have

Digestive Tract

(a) The plain X-ray has not much value save in showing gall stones and adjacent structures pressing on the œsophagus intestinal obstruction when the presence of fluid and gas causes fluid levels from which the site of the stoppage can be ascertained.

(b) The opaque meal and enema give more evidence of disease than any other method of examination of the œsophagus stomach or large gut. Obstructions of the gullet may be experienced due to sacculations enlarged thyroid or aneurism.

cardiospasm or cancer, all of which give a characteristic picture. Of gastric diseases the most important are ulcer and cancer, the former revealing a scooped-out appearance to the profile, the latter showing a "filling defect" due to growth occupying part of the stomach instead of barium meal. The stomach is the seat of many nervous manifestations which mimic true disease. The opaque enema is valuable in the diagnosis of inflammatory mischief and cancer of the colon; the rectum is not suitable for X-ray examination.

"Whitewashing" is often of greater value than the full meal as it portrays ulcers and cancers on the anterior and posterior walls of the stomach which are obscured by the previous method. Unfortunately it is much more tedious.

Liver, Spleen and Gall-Bladder

The liver and spleen are a closed book as regards X-rays. They appear as shadows but these are too hazy to be of value. The gall-bladder, which may be looked at as the "mouthpiece" of the liver, is very prone to inflammation and consequent stone formation; such stones have been found in the gall-bladders of the ancient Egyptians, 5000 B.C. In 50-80 per cent. of cases the stone can be seen between the last rib and the vertebral column.

Our knowledge of the gall-bladder and liver has been revolutionised by the work of Grahame and Cole, who by means of an iodine preparation found that the organ could be visualised. Its excretion, concentration and its emptying are of the utmost importance in the study of gall-stones.

Kidney, Bladder and Ureter

The kidney, ureter and bladder are, like the gall-bladder, subject to stone, for which a plain X-ray is usually sufficient, as their calcium content is considerable. Large stones may form a complete cast of the renal pelvis of the kidney, others may be mistaken for gall-stones or calcified glands unless further investigation is made as follows:

By means of radio-opaque catheters the whole course of the ureter can be made out, and shadows not touching them can be ruled out as not being urinary. Through them radio-opaque substances can be introduced into the pelvis of the kidney, enabling a diagnosis of malformed, infected, or neoplastic kidney to be made. By X-rays cancer may be diagnosed so early that a cure may be anticipated.

More recently it has been found possible to obtain much of the above information without the difficult and painful passage of catheters by injecting an iodine salt into the blood stream, or even by mouth, though the shadow cast is not so clear. It is possible to recognise inflammation and tuberculosis by its means; moreover it gives an indication of kidney function.

Lungs

A plain X-ray usually gives all the information required. No conscientious medical man would dream of treating a case of tuberculosis of the lung without

X ray control The feel of the chest the resonance and the breath sounds are all personal impressions, and as such are grossly subject to error, what may be detected by one doctor may be contradicted by another or by the physician himself the next day. The radiographic film gives a permanent record. The proper carrying out of artificial pneumothorax would be impossible without X rays. The diagnosis of early lung cancer—which is increasing—is impossible without them.

The introduction of iodine compounds into the bronchi is of use with certain forms of bronchiectasis and in new growths of the lungs.

Nervous System

Cerebral tumours were among those last attacked by the surgeon. Before the advent of radiology it was almost impossible to localise them accurately. It has been discovered that they are not so virulent as many others. They may be recognised by minute changes in the bones and by the deposit of lime salts within them in the plain X ray.

The ventricular cavity is capable of being filled with air or opaque medium. the movement of either of these is liable to arrest at certain points and on these findings a tumour can often or rather can usually be diagnosed.

Heart and Blood Vessels

Generally speaking the heart and vessels do not lend themselves to radiology owing to their continuous movement. Angina pectoris is diagnosable, as are two birth conditions patent ductus arteriosus and coarctation of the aorta in which brilliant surgery has scored success. Aneurysms of the aorta and of other vessels are detectable. It was such a case, which had defied other methods of diagnosis which won over Sir William Osler to the value of X rays.

Midwifery

X rays can be of great service to the accoucheur. In pregnancy the number of foetuses can be foretold. The relative size of head and pelvis will show whether the mother can have her child normally or not. The recognition of monsters justifies interference by the medical man. Death of the baby can be proved by changes in the skull gas in the heart or rolling up of the foetus and calls for abortion since it is futile to give the mother any purposeless pain.

By the injection of iodine compounds, or air into the uterus sterility can be investigated.

THE "G.P." X-RAY VIEWING BOX

With the increasing usefulness of X-rays the practitioner is taking more interest in the films on which the radiologist bases his report. At the moment the difficulty of getting films printed makes it almost essential for him to have a viewing box. Whilst the price of such is not important to a hospital or radiologist using it the whole day, the cost cannot be disregarded for one using it at intervals only.

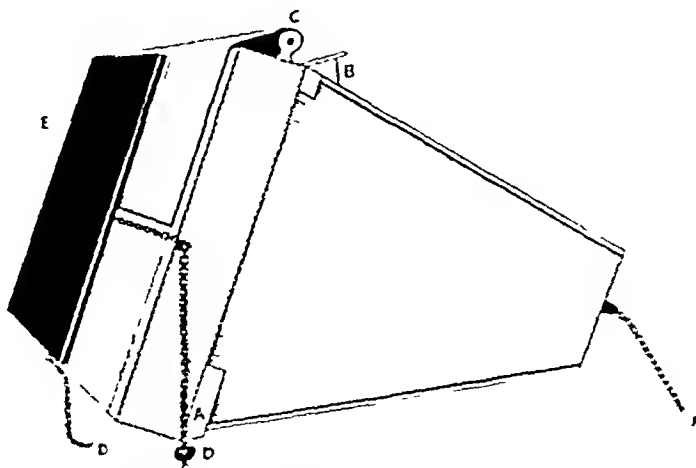
The "G.P." is in the form of a truncated pyramid not unlike the Royal Cancer Hospital pattern. The front of the box—the base of the pyramid—is a sheet of flashed opal glass; at the back is a hundred-watt electric bulb mounted on the rear, and on the top and left side are blinds, like those of Newton and Wright, provided with chains by which they may be drawn downwards and to the right respectively, the chains being secured by hooks. The front has a tilt so that there is no danger of the film, held in a slit at the bottom and right side, falling forwards. Behind the upper blind is a slit to act as a chimney; opposite to this is a flue in the base; these keep the glass cool, thus there is no danger of the emulsion "running". Ideally the whole is made of aluminium, but owing to the scarcity of this metal it is made of three-ply wood, painted white inside. Rubber stops beneath, to prevent scratching, and a carrying handle complete the apparatus.

Method of Use

All films are placed in slits in the bottom and right-hand side of the aperture. 17 x 14 in. films only require the blinds for examining particular areas. Those less than this size down to the smallest ($1\frac{1}{4} \times 3\frac{1}{4}$ in.) require the blinds to be drawn downwards and to the right respectively. The blind acts like the black in the silhouette radiograph, it throws the picture into relief. Examination of the pituitary fossa is facilitated by a cardboard mask with an inch-square corner cut out.

Advantages claimed

- (a) Reasonable cost (£5 for this prototype in three-ply wood)
- (b) Absence of heating. A hundred-watt lamp in an enclosed space would generate considerable heat.
- (c) Absence of "dazzle" by use of blinds eliminating glare of space surrounding negative.
- (d) Portability, when made of aluminium. (Made by Messrs T. Hodman, Maxwelltown)



A - FLUE B - CHIMNEY C - BLIND UP
D - CHAINS E - BLIND LEFT F - FLUE

FIG. 2

MILESTONES IN RADIO-DIAGNOSIS

History—The production of X rays is intimately bound up with the vacuum tube. According to Pullin and Wiltshire the credit of taking the first step in their discovery belongs to Hawkesbee who in 1703, observed flashes of light on agitating mercury in a vacuum, in 1709 he was able to see his hand through the sealing wax lining of such a tube. (This result was recently confirmed by Crane and Hornbeek U.S.A.) He was followed by Abbe Nollet (1769) of Paris who amused and interested the dilettanti at the French Court with such tubes, also with apparatus devised by Otto von Guericke (1650). The first actually to produce X rays was certainly William Morgan, who in 1785 noted the difference in colour in vacuum tubes with varying degrees of exhaustion. Then came Humphry Davy (1822), Faraday (1835) Crookes (1878) and Hittorf (1869). Crookes in England and Hittorf in Germany independently discovered and studied the cathode rays. The production of these rays caused universal attention. The fluorescence they excited in the walls of the tube were a source of wonder. Experiments were carried out in the whole of the civilised world to determine their properties. The stage was set for Roentgen's epoch making discovery. Though it could not be called accidental it was made inadvertently.

On 8th November 1895 Roentgen was working with a tube such as Crookes and Hittorf had invented when he noticed that some barium platino cyanide crystals at some distance from the tube fluoresced though the tube happened to be covered with black paper. "I did not think I investigated" said Roentgen. He found that if certain bodies were placed between the tube and the crystals a shadow was cast. By placing his wife's hand on a photographic plate and exposing it to the rays he obtained the first radiograph ever made. As Hedley stated "It was the hand that led the way".¹ Crookes had observed fogging of photographic plates in the vicinity of tubes but had made no effort to explain it. Almost simultaneously Cox of McGill University, Montreal made a radiograph of a bullet in the thigh. Crookes' tubes being widely distributed throughout the world Roentgen's experiments were repeated and confirmed every where in an incredibly short time. As Silvanus Thompson more poetically puts it

"All can raise the flower now
Most have got the seed"

No method of diagnosis has ever fired the enthusiasm not only of medical men but of the general public as did the discovery of X rays. In a night it seemed X rays had sprung into the limelight. There was a minimum of that caution with which most new ideas are received in our profession. Roland (London) writing the preface to the *Archives of Clinical Radiography* which appeared as early as 2nd April

¹ The first British account appeared in *Nature* 23rd January 1896

1896, wrote: "The progress of this new art ('New Photography') has been so rapid that, although Professor Roentgen's discovery is only a thing of yesterday, it has already taken its place among the approved and accepted aids to diagnosis. At the first moment the statement that it has been possible to penetrate the fleshy coverings of bones and photograph their substance and contour, seemed to be the realisation of an almost impossible scientific dream." Later he wrote of the "weekly progress."

On 3rd June 1897 Hedley (London) gave an illuminating address on what had been achieved up to that date. He stated that "the services of radiology to surgery and medicine are fully recognised and full of promise." The diagnoses were truly remarkable considering the crudeness of the apparatus available. So primitive, indeed, was it, that some years later Roentgen declined to show his original apparatus in London, as he explained that it was "home-made" and very rough. A great advance was made almost immediately by Jackson, who devised the focusing tube.

The possibility of localising foreign bodies by X-rays undoubtedly gave a great impetus to the science.¹ X-rays were extensively used in the Soudanese and Greco-Turkish campaigns, and later in the Boer War. Pictures of the conditions under which the rays were produced appear in the *Archives of Roentgen Rays*. The application of X-rays to the different systems of the body has advanced erratically, under the lead of some pioneer marked progress has been made in the case of one system, with none in others; thus it becomes advisable to study each section separately.

THE BONES

Bone has been the occasion of intensive study from the time that Roentgen radiographed his hand. As Kassabian wrote in 1904: "One sees not only the outline of the bone, but its varying texture and trabeculation."

1896. Within six months of their discovery X-rays had been used in the diagnosis and subsequent treatment of fractures and dislocations with surprising success considering the apparatus of the time. Hibner described the appearance of the tophi of gout. Kummel (Munich) made the shrewd remark that success is not always attained when a snap occurs on attempting reduction of a dislocation. MacIntyre (Glasgow) made cinematograph records of frogs' limbs.

1897. Kummel (Munich) described curies of the cervical spine, and prophesied that X-rays would be found to be of great service in osteomyelitis, syphilis and tuberculous of bones.

1898. Poland's monumental work on epiphyses containing many skigrams appeared.

1899. Chene (Edinburgh) pleading the cause of radiology in an address, said: "When you touch a patient in surgery, make your diagnosis, if possible, painlessly. Crepitus as a diagnostic sign of fracture, is a forlorn hope of a surgeon." Oppenheim diagnosed a pituitary tumour, subsequently proved at autopsy. Mackintosh published an Atlas of Radiographs.

¹ The first operation performed by the help of X-rays in England was done in Manchester, and consisted in the removal of a needle from a dancer's foot.

1900 A prominent medical journal declared that so far as fractures are concerned it must, we think, be admitted that the practical gain is inconsiderable. This shows something of the uphill fight of the pioneers. (Let it be noted here that full amends have since been made by this journal.)

1902 Becière (Paris) described the changes in the size of the sella turcica in disordered function of the pituitary gland.

1904 Thurstan Holland (Liverpool) diagnosed the cause of a spontaneous fracture often a matter of grave clinical difficulty as being due to sarcoma from the irregular deposits of lime. Kisselburgh (Philadelphia) applauded the immense superiority of X rays over clinical methods in the diagnosis of fractures and the great advantages they possessed in being of use with splints *in situ*. Exposures he adds had been reduced from minutes to seconds. Cramer described the appearance of metatarsal varus.

1905 Lovett and Brown foreshadowed the discovery of pseudo coxalgia by Legge in 1909 by their researches on morbus coxae. Carl Beck (New York) wrote in a similar strain his adoption of X rays in the diagnosis and proper treatment of tuberculosis in bone was hailed as a triumph by Thurstan Holland. Beck being a clinician Beck wrote:

Roentgen's discovery has enabled us to recognise early foci and perform conservative operations. It is a fact that since the use of X rays became general treatment for bone tuberculosis has tended to become less and less mutilating. Luckenschadel was reported by Engstler the skull showing many osseous defects.

1907 Deveke Paslia (Constantinople) differentiated the bone atrophy of the nervous form of leprosy from the inflammatory changes in the nodular form. Goland (London) and Graessner (Cologne) gave excellent accounts of X ray fractures—i.e. those diagnosable only by X rays. They included separated epiphyses fractures of bony processes around the shoulder and hip fractures about joints particularly the elbow and knee also 'marching' fracture which featured largely in the Great Wars. Thomas (Philadelphia) wrote concerning the frequency of fractures of the head of the radius and the importance of their recognition. Goldman showed that spinal caries should be diagnosed without waiting for the development of psoas abscess.

1908 Ware gave an excellent account of the manifestations of syphilis in bone. Kohler (Wiesbaden) described the disease which bears his name. About this time it was realised that students ought to be given instruction in the principles of radiology and lectures were started in the United States and on the Continent. Thurnman described a peculiar degenerative condition of the bones of the feet and hands.

1909 Goldthwait (Boston) and Strangeways (Cambridge) shed light on the vexed question of the differential diagnosis of rheumatoid and osteoarthritis. Cummings (Toronto) considered osteitis fibrosa as an X ray discovery. Riesenfeld (New York) demonstrated the joint hemorrhages in infantile scurvy. Jugeas (Paris) published some of his work on acromegaly and gigantism. Legge described pseudo coxalgia which was later studied more fully by Perthe.

1910 Kemboeck (Munich) discovered a peculiar anomaly of the carpal scaphoid which has since borne his name.

1911 Potter described the radiological appearance of typhoid spine whilst Carson (London) demonstrated the difference between bone atrophy of nervous origin and that due to inflammatory mischief. Knox (London) gave a good paper on loose bodies in joints. Raolt and Deslonchamps (Paris) advocated aluminium splints on account of their radio-parency. Pancoast (Philadelphia) differentiated between cretinism and achondroplasia. Hall Edwards (Birmingham) radiographed a non fatal atlanto-axial dislocation. Kocher

extensively with nerve pains accompanying congenital defects of the lumbo-sacral joints. Colonna (New York) described a congenital pseudo-arthritis of the lower third of the leg as simulating fibrocytic disease and amenable to bone graft after the age of eight. Bush (Bristol) and Peet and Echols (Ann Arbor) dealt with hernie of the nucleus pulposus, the latter depicting narrowing of the disc and radiolucency of the vertebrae associated. Man-kowsky, Hemismann and Czerny (Kiev) found the joints unaffected in "club fingers" and that there was periostitis of the long bones similar to that found in arsenic and phosphorus poisoning. Rogers (Boston) gave the signs of fracture of the vertebral body as (a) loss of anterior concavity; (b) zone of increased density; (c) lateral or anterior wedging, (d) narrowing of adjacent discs. Phenister (Chicago) noted that the head of the femur and surrounding bone in intracapsular fracture rarefied at first, then increased in density, if bony union was to occur; the head actually showed increased density for a time if union did not take place; finally it was replaced by fibrous tissue. Graziansky (Leningrad) gave an account of Kaschin's-Beck's disease, which causes great disturbance in epiphyseal growth in parts of Russia. Gilbert Scott (London) described spondylitis adolescentis, an affection of the sacro-iliac joint amenable to X-ray therapy. E. Lloyd (London) invented an instrument for the insertion of the Smith-Petersen nail under radiographic control. Snedecor, Knapp and Wilson (Haeckensack) described periostitis of the lower end of the femur following forcible breech delivery. Weher and Brandt (Riga) by serial radiographs showed the development of bone in a mammary metastasis. Bédère (Paris) advocated a return to the arched film for foreign bodies in the knee joint; and Danelius and Miller made a study of the intercondylar space.

1936. Cubbins, Callahan and Seuderi (Cook County Hospital) advise retention of periosteum in bone grafts. Milch and Green described paralytic dislocation of the hip due to anterior poliomyelitis. Kennedy (Mayo Clinic) demonstrated three types of bone change in renal rickets. Spackman (Pennsylvania University) correlated the microscopical and radiographic findings of arthritis. Moelbig (Detroit) studied the family history of cases of Paget's disease and osteoporosis and found them often associated with diabetes and increased blood phosphates. Schlernmann (Copenhagen) gave further instances of kyphosis juvenalis affecting the 10th dorsal vertebra. Speder (Casablanca) made history by his discovery of a cause of osteopetrosis, it appears that in certain parts of Morocco where the drinking water contained large amounts of phosphates, with which were associated fluorides the natives developed osteopetrosis, once considered to be very rare but there quite common. Shephardson (California University) investigated dwarfs. Hill and Brooks (Vanderbilt University) instanced a case of Volkmann's contracture not due to bandaging. Hampton and Robinson (Boston) demonstrated rupture of the 3th lumbar disc into the spinal canal by means of lipiodol. Karasoff (Irkutsk) made a study of leprosy. Erhsen (Saarbrücken) described the spotted bones of osteoponikilosis. Zwerg and Laubmann (Koenigsberg) described the proneness to fracture, ready healing and absence of callus in "marble bone" (Albers-Schönberg's disease) and gave differential diagnosis. Steinhilber and Nauta (Leyden) cited a case of dissolution of the mandible.

1937. Speed (Chicago) observed the slow healing of carpal bones, callus being defective. Pease and Morton (Rochester) found that passive hyperemia favoured bone growth as had Colp. Kisibuch and Magi in the case of active hyperemia. Williams (Dallas, Texas) described traumatic destruction of the lumbo-sacral disc and Siskin, narrowing of the 4th disc. Caffey proved that bismuth medication caused increased density of the bones due to excessive calcification, in appearance resembling that due to lead poisoning but there due to metallic lead. Podkaminsky (Kharkov) classified bone changes in scleroderma. Bruce (Edinburgh) found that shortness, adduction and exaggerated mobility of the thumb

metatarsal was a constant finding in metatarsalgia marching fracture Deutschlander's disease and Kohler's disease Druckmann (Jerusalem) investigated non suppurative osteitis including in his survey Panner's disease of the radial epiphysis and Scheuermann's disease a collapse of one or more of the thoracic vertebrae Iannas (Ivry) showed that whilst large vessels entered malignant growths they were small in inflammatory states this was revealed by arteriography with thorium

1935 Tisdale and Drake (Toronto) showed experimentally that giving vitamin D led to calcification of organic callus around fractures Venable and Stuck (San Antonio, Texas) advocated an alloy vitallium for bone-plateing etc as it did not corrode and set up an electric current when in contact with bone Nordheim (Borgholm) was able to reveal the cartilages of the knee without the introduction of contrast media (a dangerous proceeding) by the appearance of a venum Sandstrom (Stockholm) gave an account of peritendinitis calcarea a condition of middle age amenable to X ray therapy Pack and Silverstone (New York City) revealed extreme osteoporosis in Cancer's disease Trochner (St Gallen) found osteomalacia development in a case of sprue Westermarck and Forsman (Stockholm) found early spinal tuberculosis to be confined to one vertebra in 60 per cent of cases and to several vertebrae in 40 per cent of cases Ungermann Viary and Eldridge (Washington D C) described syphilis of bone bones appear to be far less often affected than of old Peterson (Boston) found castes very much better than plaster of Paris since it was radiolucent

1939 Bishop (Oklahoma) found that the spine was the commonest bone to be affected in undulant fever Oeser (Rudolphenheim) studied bone tumours Newcomer (Denver) showed that hamophilus affected the bones usually bones of the knee joint first Little (Sidney) described the trophoneurosis Sudek's atrophy Bode (Kul) gave the differential diagnosis between tuberculous and other infective spondylitis and affections of the discs Delitch (Kraljevic) Jugoslavia showed a diseased hemangioma of the foot Santilli (Milan) gave the differences between arterial grooves in the skull and fracture Parley Costello (Hibama) in a series of 200 cases of x-rays was able to show how in some respects it simulated syphilis it was an essentially destructive process whereas late syphilis was constructive Hill (Munich) depicted a case of melorheostosis in which certain bones or parts of bones become sclerosed Morcu and Beertun (Buenos Aires) studied the radiology of flat feet

1940 Donald and Morton (Birmingham Ala) pointed out that the scapular osteitis was as often the cause of the cervical rib syndrome as the rib itself Nathan and Kubus (Boston) showed some very sharp pictures of vertebral epiphysitis the frayed contours became normal in five years Chomley Buckel and Dixon (Manila) depicted osteitis in size of intervertebral disc with infection Hopf (Bern) discovered cases of Milkman's syndrome a rarefying osteitis usually found in women at and beyond the menopause Struppler (Munich) revealed fractures by muscular action of the femora in war prisoners undergoing treatment with erythiazol Kay (Washington University) pointed to the danger of joint infection from foreign bodies lying in it by Clow and Blum (St. Louis) studied the healing of fractures of the skull a hair fracture in a child to last 10 to 15 months before disappearing whilst in adults it takes seven months for the repair of a fracture or of a bone slip Cointuro (Urbino) distinguished between dysfunction of the cortex of the adrenals pineal glands and gonads which accelerate bone growth (epiphyseal growth) and those which retard bone growth such as gonads thyroid and pituitary glands (Toulon) stressed the importance of subluxation of the lower thoracic vertebrae Wilhelm and Brandt (Munich) independently pointed out fish bones the main foreign body factor in 'march fracture' the latter compared it with foreign material in the bone

(Chicago) continued his valuable studies in the circulatory changes in bone after fracture. Richards and King (Stanford University) produced excellent serial pictures of a chordoma.

1941. Siegling (Chicago) observed the development of transverse lines at the ends of young bones under the influence of phosphorised cod-liver oil. Wilkins (Boston) showed that centres of epiphyseal ossification were often multiple in cases of hyperthyroidism. Lachman (University, Oklahoma) dealt with the limitations of X-rays in fractures of the vertebrae and skull. Colonna (Oklahoma) gave the differential diagnosis of hip disease in children, stressing the absence of pain in the early stages of tuberculosis the commonest affection. Hight (Worcester, Mass.) described a case of fracture of the femoral neck following radiation.

1942. Ghormley (Mayo Clinic) discussed low back pain, giving its differential diagnosis. Anthony Pollack (Chicago) instanced fracture in 'marble bone.' Sommer, jun., and Major (University, Michigan) dealt with neoplasms of the chest wall. Thomas (Denver) showed sections alongside radiographs, a most satisfying method. Franklin and Mithras (London) reported a case of melorheostosis, a condition in which there is patchy condensation of bone anywhere. Benninghoven (San Francisco) dealt with coccidioid infection of bone. Pollock and Bosworth (U.S.A.) gave a masterly account of tuberculous disease of the sacro-iliac joint. Jaffe and Lichtenstein (New York) studied benign chondroblastoma which occurs in the epiphysis and which yields to curettage. Sussman and Copleman (New York) described osteoporosis of the spine with spontaneous fracture in a case manifesting Cushing's syndrome. Borok (New York) found alterations in contour most valuable for malignant disease of the vertebrae, whilst alterations in density were the rule for growth in the long bones.

1943. Bromer (Bryn Mawr, Pa.) analysed the findings of infantile scurvy. Beck and Ghormley classified osteogenesis imperfecta into fatal, infantile, adolescent and late. Borden (Univ. Penn.) reported on a case of radiation fracture which united. Phalen and Ghormley (Mayo Clinic) discovered a curious case of multiple osseous condensation. Schumacher (Pittsburg) stated that compensations for low back injuries far outweighed that for any other region: he pleaded for immediate X-ray examination. Fried (New York) considered the bone changes of pulmonary arthropathy to be of endocrine origin. Groh (Cleveland) stated that Paget's disease affecting a single bone was a clinical entity. Pike examined a case which developed into sarcoma. Goldman and Smith did some interesting work on jaws.

1944. Lubert (Cleveland) instanced three cases of actinomycosis affecting the spine. Faget (Cerule, Pa.) and Mayoral (New Orleans) proved that the bone changes in leprosy were nervous in origin rather than due to the leprosy bacillus. Burger (Wichita, Kan.) watched a case of leontiasis ossium for thirteen years. Chondromatosis of the joint capsule was studied by Politzer (Patrida). Petersen (Aarhus) illustrated the treatment of congenital metatarsus varus, a commoner condition than generally thought.

1945. Holt and Hodges (Univ. Michigan) dealt with affections of the hands in a masterful manner, among them being acromegaly, cretinism, mongoloidism, hyperthyroidism, clado-craniodysostosis, achondroplasia, Morquio's disease, gingivitis and diastylia (associated with dislocation of the lens), syringomyelia, leprosy, Raynaud's disease, erythromelalgia, scleroderma, tuberculosis, syphilis, Broek's sclerod, pulmonary embolism, pyrexia, gonorrhea, gout, rheumatoid and osteoarthritis, etc. DeBorja and Groh tried to clear up the nomenclature of aseptic necrosis. Seymour P. Rice and H. C. (New York) described arachnodactyly as a familial condition. McGee and Wicks (M.C., A.U.S.) successfully injected 500 knee joints with oxygen this put the literature

on a proper footing (A synovial membrane is less tolerant of infection than the pleura or peritoneum) Bonnet and Baker (M C A U S) studied flat foot Muschat (Philadelphia) described a form of osteitis of the pubis following prostatectomy a condition previously detailed by Cohen (New York) the pubis becoming the seat of transient bone atrophy Heyman (Cleveland) demonstrated a case of spontaneous fracture of both femurs following radiation for carcinoma of cervix Wolfe and Robertson (London) watched the union of fatigue fractures of femur and tibia Marek and Schern (New York) studied aseptic necrosis of the astragalus following arthrodesis of the foot Overgaard and Wilson (Viborg) found Bechterew's disease to make its first appearance in the sacro iliac joint Altemeier and Reinecke (Univ Cincinnati) published striking pictures of acute osteomyelitis treated with penicillin Wilkinson (London) emphasised the value of a lateral view of the hip in tuberculosis Kenney (Ile) studied a case of multiple spontaneous fractures as a result of a frontal tumour Branch (M C A U S) showed a case of spontaneous rarefaction of the clavicle Milkman's syndrome characterised by multiple rarefactions was recorded by Lepennetier Gilbrin Codefroy and Trietot (Paris) and in the following year Buetti (Basel) Burrows and Graham (London) made a study of osteoporosis due to vitamin lack Jaffe (New York) worked on osteoid osteomata

1946 Petersen (Aarhus) found metatarsal pyrexia commoner than generally supposed Van der Sar and Hartz (Curacao) published an interesting case of mycetoma of foot Niebauer (Stanford Univ) recorded a good case of carcinoma originating in chronic osteomyelitic sinus Ghormley Meyerding Mussey and Luckey (Mayo Clinic) made a study of twenty six cases of osteochondromas of the pelvis Leonard (Exeter N H) found the hand to be the surest guide to maturity of the skeleton in endocrine disturbance Humbert (Neuchatel) described a case of congenital hypervitaminosis in the new born the mother having taken excessive doses Meschry (M C A U S) studied spondylolisthesis Copleman Vidoli and Crummings (M C A U S) instance three cases of cysts of the os coxae Denmark and McCarthy (M C A U S) investigated a case of Binner's disease a cystic state of the metatarsus analogous to Perthes disease resembling marching fracture Arthritis mutilans was described under the term opera hands from the telescoping of the metatarsus and phalanges by Nielsen and Snorrason (Copenhagen) Hamilton *et alia* described bone changes in eosinophilic granuloma

1947 Vinke and Duffy (Cincinnati) detailed irregular calcifications in bones Hardy and Hartmann (Boston) found that half the cases of tuberculous dactylitis were present in advanced cases which died early the other half where it was an almost primary condition responded well to treatment Key (St Louis) and Conwell (Birmingham Ala) published a fourth edition of *The Management of Fractures Dislocations and Sprains*

NASAL ACCESSORY SINUSES AND EYE

In many hospitals great reliance is placed on the X ray findings of sinus disease

1903 Though Scher had obtained radiographs in 1897 it was not until Killian's classical work appeared that sinus radiology received the attention it deserves

1906 Chisholm proved that the opacity of a sinus was due to its replacement whether by solid or fluid often required other evidence

1908 Kautner's Atlas and Loe in Turner's book did much to popularise radiology

1912 Pirie (Montreal) showed the use of radiographs of the mastoids this is a subject still not generally known when the air cells are large and the petrous bone not unduly prominent disease tends to be mild

1913. Martin Berry (London) gave an excellent history of the progress of radiology in the study of nasal sinuses, and described the best positions for examination.

1915. Dixon made the important observation that "X-rays settle the question of operation even if the clinical findings oppose it." Skillern and Pfahler (Philadelphia) obtained radiographs of the sphenoidal sinuses.

1917. F. W. Law confirmed Pirie's work on the mastoid air-cells, and described the appearances of the lateral sinuses.

1928. Brown and Remeke studied the hypopharynx by lateral films without opaque media.

1931. Proetz (St Louis) found that lipiodol injected into the maxillary antrum gave valuable data in the diagnosis of neoplasm.

1933. Groth (Upsala) made a study of adenoid vegetations.

1934. Groth found X-rays useful in nervous children in the diagnosis of adenoids.

1935. Lindblom (Stockholm) devised apparatus for bone-free radiography of the eye, whilst Farberov and Medvedev (Kharkov) introduced iodipin into the capsule of Tenon, both of which were used for localisation of foreign bodies. Granger (New Orleans) found that the line which bears his name was invaluable for the diagnosis of sphenoidal sinus disease. Taylor (New York City) showed that the pneumatic mastoid always shows diminution in density in cases of otitis media, in chronic disease the air-cells disappear and the apex tends to become rarefied.

1937. Rokhlin and Rubarkeva (Leningrad) made a study of pneumatisation of the mastoids, finding them bilaterally similar in 80 per cent of cases. Kopetzky and Almour (New York City) investigated ten cases of petrosal suppuration by means of lipiodol. Ustel (Ankara, Turkey) described carcinoma of the middle ear. Kcinhocck and Selka (Yumra) described osseous metastases from a Schmincke's tumour, one arising from the pharyngeal tonsil; it is very malignant but amenable to radium therapy.

1938. Crane (Corpus Christi, Texas) made a study of the infantile mastoid.

1939. Fowler and Swanson (Columbia) stressed the importance of radiology of the petrous bone in all cases of mastoid disease, owing to its frequent involvement.

DENTAL SYSTEM

Besides being invaluable to the dental surgeon, the teeth are equally so to the medical man who is searching for foci of sepsis, of which suppurating pulp cavities are the commonest.

1896. C. A. Clark (London) introduced dental radiography to Britain.

1909. Haensch (Hamburg) published some beautiful plates of teeth. Upson described forms of neurasthenia and insanity due to dental foci of infection. His observations on the painless nature of such teeth ring very modern also his dictum: "There is no sure method of rendering a dead tooth aseptic."

1913. Raper (Albuquerque) published *Elementary Dental Radiography*.

1917. F. D. Leach showed that 90 per cent of root-filling were infected, and showed radiographic evidence.

1919. Thoma (Boston) published his classic, *Oral Roentgenology*.

1920. Woodroffe (London) wrote: "It is not necessarily the patient whose teeth have been neglected who shows most trouble in the form of hidden and painful abscesses."

1923. Weston Price (Cleveland) comprehensive *Dental Infection: Oral and Systemic*.

appeared. He stated that the dental granuloma should be regarded as a protective mechanism.

1935 Geschuekter (Baltimore) analysed 323 jaw tumours and found radicular cysts to account for fifty seven. They were usually around unerupted third molar teeth and occurred in youth. The adamantinoma epithelioma was also commonest in youth, the most frequent symptom being pain in a loosened tooth. It is either mono or poly cystic and shows a periosteal reaction. Epithelial hypertrophy, granulation tissue and angiomatous areas are common in pregnant women. In thirty cases of ossifying fibroma which produced a painless swelling, only ten sarcomas were encountered. Paget's disease and Von Recklinghausen's disease often start in the mandible. Carcinoma of the antrum is the commonest malignant affection of the maxilla (Havenstein, Leipzig).

1936 Nahé (Paris) described an interesting fracture of a tooth.

1938 Bugge and Dahl gave an exhaustive account of root cysts affecting the maxillary antrum. Praeger (Chemnitz) dealt with infection from dead teeth.

1941 Sarnat, Schour and Heupel (Chicago) showed that it was possible to diagnose syphilitic teeth in radiograms.

1942 Gardner dealt in detail with impingement on the inferior dental nerve by impacted wisdom teeth.

1944 Radiographs showing fillings, crowns, caries, etc. are being used in the identification of war criminals.

1946 Fibro osteomata, usually found in the jaws and may affect the cranium. At times they are eburnated according to Billing and Runbertz (Stockholm). Wass (London) investigated the three epithelial odontomes: the dental and dentigerous cysts and adamantinoma or multilocular cysts. The first owes its being to persistent apical infections; in the case of the second an unerupted tooth provides the stimulus. The third is the only true odontoma; it is locally invasive unlike the other two. Osteoclastoma myeloid sarcoma is rare; its plum colour is characteristic. Osteitis fibrosa presents difficulty in diagnosis; it may be diffuse or localised. Osteomyelitis results in local osteitis and typical sequestra. Actinomycosis, curiously enough, has no effect on the X-ray appearance of the jaw. Bertwistle and Mackenzie (Birmingham) found buried roots, cysts and feather edges of bone to be responsible for the persistence of symptoms after wholesale extraction in many cases, though an error in diagnosis is the commonest cause.

ALIMENTARY SYSTEM

1897 Bois and Levy demonstrated gastric dilatation by means of bismuth capsules coated with gelatine. Benedict, using capsules of reduced iron, was able to localise abdominal lesions.

1900 To Strauss belongs the credit of first suggesting the opaque meal.

1901 This year saw the dawn of radiology of the gall bladder. Carl Beck (New York) obtained the first picture of a gall stone. It was some time, however, before any accuracy was attained in their diagnosis.

1903 Walsham (London) diagnosed a carcinoma of the oesophagus by a suspension of bismuth carbonate in milk. Albers Schonenburg (Hamburg), to whom radiologists owe a deep debt of gratitude for technical inventions, distinguished between subphrenic abscess and pleural effusion.

1904 From this year dates the routine use of the opaque meal in diagnosis. It was introduced by Rieder (Munich). (His technique was for a long time dropped in favour of one by which the contour of the organ, only, was seen, now, thanks largely to Forssell's efforts, it is coming more and more to the fore.) "So much faith is put in this form of examination in some hospitals that it is the routine method for all abdominal cases, thus doing away with laparotomy, with its expense and suffering." These words written in 1904 are still to be accepted in all too many hospitals to-day, especially considering the danger of abdominal operation in patients over fifty. Thurstan Holland first secured a picture of stricture of the œsophagus.

1905 Pfahler gave a good account of the possibilities of the bismuth meal.

1906 Thurstan Holland (Liverpool) found that the 'wedding ring' appearance of gall-stones was due to a deposit of lime salts in the periphery. Rowden (Leeds) started his excellent work on the opaque meal. Holzknecht (Vienna) published the first of a series of brilliant researches which have not been excelled since. He found that the 'normal' stomach did not exist. He introduced us to that bugbear of the surgeon "gastroptosis." The outstanding discovery he announced was the detection of non-palpable cancers of the stomach. Rosenthal (Munich) confirmed Holzknecht's findings.

1907 Emhorn (New York) using bismuth, was able to study the stomach and colon, and introduced plates into his *Diseases of the Stomach*. Goldmann (Freiburg) and Wessling showed that concretions in the appendix were often opaque and liable to be confused with ureteral calculi. Goldmann described one of the first cases of diverticulosis, which may be regarded as an X-ray discovery. Henninger (Baltimore) detected the niche of a gastric ulcer.

1908 Holzknecht (Vienna), continuing his studies, found that there was only one type of stomach which constantly recurred, the "cow- or steer-horn" form, with the pylorus at the lowest point. He found that the gas bubble at the cardiac end of the stomach was due mainly to swallowed gas, relatively large in amount in hysterical patients. He was able to detect a date-stone in the œsophagus by means of the bismuth meal. He also investigated the gastric motor function. Jolasse (Hamburg) identified the "flick of bismuth left in an ulcer crater after the passage of the meal"; he wrote "X-rays are not in opposition to clinical examination but a part of it." Lange (Cincinnati) made a valuable contribution to our knowledge of deglutition and its disorders.

1909. Holzknecht (Vienna) solved the vexed question of the passage of faeces along the colon; he was able to see "rush peristalsis" occurring, which resulted in faeces passing along one-third of the colon in one or two seconds; it occurred two or three times a day and was seen in two out of 1000 cases examined. Pfahler (Philadelphia) emphasised the importance of arrest of the peristaltic wave, stating that if not actually caused by a cancer, it implied serious trouble. Leonard (Philadelphia) following in the footsteps of the physiologist Cannon (1898) did much to clarify our knowledge of peristalsis in man.

1910 Groedel (Bad Nauheim) gave a cinematograph record of gastric movements followed in a few days by Kaestle, Rieder and Rosenthal.

1911 Thurstan Holland (Liverpool) confirmed the theory that organic 'hour-glass' stomach was due to cicatrization following a lesser curve ulcer. Hueter pleaded for the use of X-rays in the diagnosis of œsophageal conditions in preference to the oesophagoscope, being attended by less danger and inconvenience. This year saw a revolution in our ideas of gastric disease. Whilst others had diagnosed gastric ulcer, it was by good fortune rather than merit. Hudek (Vienna) working in Holzknecht's clinic had diagnosed thirty-four cases by 1910. He now published an excellent paper on gastric ulcer. Pavet (Vienna) affirmed that peptic ulcer was overlooked rather than rare. Hudek's motor meal, given six hours before examination, was a real advance. Holzknecht (Vienna) published a paper

classic account of gastric cancer which he classified into *Symptom Complexes* thereby correlating clinical and radiographic signs. Schmieden wrote: "Factors in modern stomach diagnosis are three in number: History of the Case, Palpation and Roentgen Diagnosis." Laparotomy is now altogether superseded. Von Bergmann complained of physicians without shame confessing that they knew nothing of Roentgen Diagnosis. Becker (Paris) and Williams (Philadelphia) independently demonstrated radiographs of liver abscess. Case (Battle Creek) detected nitrograde filling of the stomach after giving an enema. Barclay and Bythell (Manchester) showed that spasmodic hour-glass stomach disappears on the exhibition of belladonna when due to extrinsic causes other than duodenal ulcer.

1912 Haemisch (Hamburg) stressed the superiority of the opaque enema over the meal for conditions of the colon. Holzknacht (Vienna) described the three levels of the niche of a gastric ulcer: uppermost level of gas, middle of secretion, lowermost of bismuth.

1913 Haudek (Vienna) proved that whilst enteripertistalsis was not always associated with gastric stenosis it invariably meant organic disease. Desterneux (Paris) and Quimby (New York) gave excellent accounts of chronic appendicitis, one of the surgeons *bullet points*. Case (Chicago) and Gregory Cole (New York) staged a magnificent exhibition of gall bladder studies at the First International Medical Congress in Radiology in London. Case in a masterly fashion by direct vision of stones and by distortion effects of the duodenum and colon indicated what had been done. Janz (Paris) described the appearance of hydrid of the liver and Thurstan Holland (Liverpool) and Barclay (Manchester) independently described hour-glasses in the stomach. Stierlin gave one of the earliest accounts of the X-ray appearance of colitis, noting the loss of haustration and rapid transit of food from one sector to another.

1914 Kienboeck (Vienna) described tuberculous cecum, noting the absence of meal within it. Barclay (Manchester) published work on the positive diagnosis of duodenal ulcer. Case (Chicago) gave accurate descriptions of cancer of the colon using the enema in preference to the meal.

1916 Carman (Mayo Clinic) who was the ideal radiologist—a man who divided his time between the X-ray room and the operating theatre—was very enthusiastic about Barclay's work on the direct evidence of duodenal ulcer. He described some of the types of deformation found. The prophecy of Case (Chicago) regarding the ultimate possibility of obtaining shadows with 50 per cent of all cases of gall stones was realised in his able hands. Duodenal ulcer was easy to diagnose as gastric ulcer with him though others are not so successful. Lunz (London) gave an excellent account of pharyngeal diverticula.

1917 Carman's classic appeared *The Roentgen Diagnosis of the Alimentary Canal*. It still remains the most comprehensive reference book on the subject. Lison (U.S.A.) described the flooding of the intestines by the opaque meal in spite of the constipation associated with tuberculous enteritis.

1919 Spriggs and Warner (Ruthin) gave us our best account of chronic appendicitis. Even now the condition is seldom X-rayed though results of operations show only a 50 per cent cure, proving that there is a great deal of room for improvement in diagnosis. If the organ fills with barium it is one of the easiest to examine. Holmes (Boston) showed that benign gastric tumour though causing a filling defect did not usually result in arrest of the peristaltic wave.

1920 McLeod (Shanghai) pleaded for the stereoscopic X-ray in the differential diagnosis of renal and biliary calculi. Weiss (U.S.A.) discovered the powerful cholangiographic action of Epsom salts. E. P. Quinn (U.S.A.) described duodenal ileus.

1921 Erasmus Ellis confirmed Spriggs' views on chronic appendicitis. Fowler (U.S.A.)

drew attention to the manifestations of syphilis in the stomach, describing the changes as being ulcerative or fungating. Enenbo Cumbo (Italy) diagnosed a pancreatic cyst by means of skiagrams. Mayo confirmed Moynihan's dictum that the radiological report takes precedence of any other single method of examination in gastric cases. Kohnstam and Cave (London) prepared urothiograms of strictures, fistulae, prostatic enlargement and tumours. An oblique position is essential.

1922. Gilbert Scott (London) gave an excellent résumé of the present position of the barium meal. Beath (Belfast) gave the X-ray characteristics of Hirschsprung's disease. Rowden (Leeds) found that pyloric obstruction with a small stomach was usually due to cancer, whilst with a large organ it was caused by ulcer. Rowden (Leeds) diagnosed jejunal diverticula. George (Boston) gave an excellent account of the position of radiology of the gall-bladder, mentioning the pioneer work of Knox and Thurstan Holland in this country, and of Cole and Case in America; he paid tribute to Knox's *Radiography of the Gall-Bladder*. He said that Kirkland (Munich) had successfully diagnosed disease in 95 per cent of his cases presenting symptoms, so perfect had his technique become.

1923. Akerlund (Stockholm) demonstrated the niche of duodenal ulcer in 60 per cent. of cases. Pirie (Montreal) was able to show the ideal position for the stoma of a gastro-enterostomy, radiographically. Forssell (Stockholm) advocated the return to Rieder's technique of using thin emulsions so as to obtain relief instead of contour pictures. Forssell's efforts are now bearing fruit; this technique is a valuable rediscovery. Ström (Umeå, Sweden) studied jejunal ulcer.

1924. Bécélère (Paris) investigated stomach function after gastro-enterostomies with stomata at different levels. Laurel (Upsala) worked on the subject of abdominal dermoids, which he recognised by the presence of teeth and bone. Lenck (Germany) detected foreign bodies in the œsophagus by means of the barium meal. It was in this year that Graham and Cole made the discovery that sodium tetramodophenolphthaleine given intravenously was excreted by the liver and concentrated by the gall-bladder, it has revolutionised our ideas of gall-bladder pathology. There is a brilliant future for research along these lines.

1925. Case (Chicago) had by now done over one thousand cholecystographies, his experiences and those of S. Moore (St Louis) make most interesting reading. Menes and Robinson found that the medium could be administered orally. Feissl (Lansanne) described ileo-cæcal tuberculosis.

1926. Akerlund (Stockholm) classified diaphragmatic hernia.

1927. Woodburn Morrison (Edinburgh) wrote an admirable account of the development of the technique for the opaque meal.

1928. Anderson (Otago) described the X-ray diagnosis of hepatic hydatids, a relatively common disease of Australasia. The first varices of the œsophagus were diagnosed by X-rays.

1929. Garland (San Francisco) studied gastric motility. Beath (Belfast) discussed "leather-bottle" stomach. Handek (Vienna) gave a memorable address on the possibility of early Roentgen diagnosis of cancer of the stomach.

1930. Barclay (Cambridge) gave an excellent account of the mechanism of swallowing. Cole (New York) stressed the importance of relief pictures of the gastric mucosa attaining great importance to phability and peristalsis. Kadzuka (Geneva), who had worked in Radt's laboratory in Germany, applied the latter's work on Thorotrast clinically, in demonstrating hepatic and splenic function, showing that the thorium was not taken up by tumours and cysts. By reason of its persistence over long periods and its radio-activity, however, thorium is distrusted at present.

1931 Peltason and Weber (Prague) made a critical review of the literature of 1931. In this they drew attention to the great importance of relief pictures in benign tumours of the stomach and in the study of the large intestine they recommend the proctoscope before X ray examination radiology of the chronic appendix they found invaluable with this Payne (Portland Oregon) was in agreement. Ranoder Bock Bruecker and Kremster independently showed cases of tuberculosis of the stomach in phthisical subjects. Kadrnka using Umbrathor (thorium hydroxide) was able to produce beautiful relief pictures of the large intestine. Anzilotti noted peristalsis to be excessive in the stomach and small intestine in cases of lead poisoning doubtless the explanation of the characteristic colic. Akerlund (Stockholm) had so perfected his technique that he was able to diagnose the actual type of ulcer present in the duodenum. Mangot (London) discussed the connection between chronic appendicitis and duodenal ulcer. Spriggs and Marver (Ruthin) dealt with functional diseases of the large bowel. Regensburger (Prague) found 'cascade stomach' to be the result of inco-ordination of the oblique muscle bundles. Levin (Buffalo New York) recommended the addition of lecithin to egg yolk as a cholangogue in cholecystography. Windholz (Vienna) detailed the histology and radiology of gastritis such combinations are only too rare in view of their importance. Henderson (Texas) showed that the site of attack in mæbie dysentery was the cæcum and parts immediately adjacent unlike tuberculosis of the cæcum there is no hurrying of the contents onwards or loss of haustration.

1932 Duval and Bécclere (Paris) stressed the value of air insufflation in the examination of gastric tumours. Adams Clarke Pembrey and Vine (London) gave an interesting account of the effects of muscular exercise on gastric movement in man and animals. O Sullivan (Melbourne) presented some beautiful relief radiographs of the large intestine. Ivy and Curtis (Philadelphia) demonstrated calculi in 76 per cent of cases examined for salivary obstruction. Grantureo and Alvarez (Mayo Clinic) attempted cinematography of the stomach once accomplished this will prove of great value as a teaching asset. Rothermel (Leningrad) watched a case of phlegmonous gastritis recover. Firor (Baltimore) gave an interesting account with full bibliography of biliary fistule. Akerlund (Stockholm) made the interesting observation that in certain cases gall stones may with the patient erect assume a linear arrangement apparently floating on dense bile. Bécclere (Paris) studied the sequelæ of cholecystectomies. Kirklin and Weber (Mayo Clinic) advocated the double contrast method for carcinoma and polyposis of the colon. Sussman and Hinstorff (Prague) independently noted the sudden arrest and forking of the stream in cases of intussusception. Shapiro and Wallace (New York) depicted traction diverticulæ in the œsophagus due to the drag of fibrosed bronchial glands. Utzschneider demonstrated fluid levels in a case of intestinal obstruction noting them two hours after its onset they may however be found in cases of pneumonia and even in healthy children. Teschendorf published some excellent examples of polyposis of the colon.

1933 Sparks (London) instanced a case of carcinoma implanted on a pharyngeal diverticulum. Schatzke (Stockholm) described the normal and abnormal movements of the larynx during deglutition also in a case of retropharyngeal abscess. Velde (Griefswald) reported on the gastric mucosa in pernicious anæmia. Gutmann (Paris) gave a new sign for incipient gastric carcinoma—viz the *niche en plateau*. Lebard and Calderon (Paris) produced splendid relief pictures of the colon using thorium compounds. Mitchell and Semmes (Memphis Tenn.) illustrated Hirschsprungs disease before and after sympathectomy.

1934 Preuschhoff (Dusseldorf) noted the frequency with which the sinus pyriformis and vallecula filled in paralytic conditions of the œsophagus a fact first noted by

Baummeister (Munich), Kinklin (Mayo Clinic) gave the Roentgen signs of simple, uncomplicated duodenitis.

1935 Beig (Hamburg) in an address on mucosal relief patterns paid tribute to the work of Åkerlund (Stockholm). Barclay (Manchester) noted the slow intermittent non-propulsive movements of the colonic haustra by ené-radiography. Forssell (Stockholm) analysed the relief picture of the stomach mucosa as (a) high relief; (b) flat relief; (c) micro-relief, etc. The Mayo Clinic essayed to determine the life-history of a simple tumour of the stomach which turned malignant. Pape (Vienna) observed marked filling defects in achyllic chloraemia. Kadinka and Bardet (Geneva) noted the appendicular origin of periduodenitis. Prévôt (Dartmund) suggests fluoroscopy of the chest straight X-ray of abdomen in upright position, followed if possible by enema, in ileus; this view is shared by Stewart and Illick (New York City). To Pfahler (Philadelphia) belongs the distinction of being the first to X-ray a Meckel's diverticulum. Rutledge (Shreveport) witnessed the reduction of an intussusception under fluoroscopy by means of an enema, which result had been previously observed by Waters (Baltimore). Pater and Aseroft (London) published some interesting work partly experimental on the X-ray diagnosis of acute intestinal obstruction. Bánszky and Koppenstein (Budapest) considered that the mesura cardiaca prevented malignant disease spreading upwards to the oesophagus. Reimburg showed that the hypertrophic form of gastritis is easier to demonstrate on the relief radiograph than is the atrophic form. Jones, Benedict and Hampton (Mass. Gen. Hosp.) found that in pernicious anemia the gastritis persisted after apparent cure of the disease. Haraborsky (Budapest) found that carcinoma of the ampulla of Vater constituted 2.5 per cent. of cases of abdominal cancer.

1936 Neagh and Lauche (Bonn) found Thorotrast to be a dangerous drug. Grilli (Rome) showed the import of oesophageal varices in the diagnosis of portal obstruction and gave differential diagnosis. Stumpf (Munich) studied inga with flat kymograph. Prévôt (Hamburg) investigated the action of corrosives on the oesophagus and stomach. Ewart and Cordner (London) pointed out that haemorrhage is a common sign of gastric diverticulum. Bayer (Offenbach) recommended larcain in the treatment of acute ulcer as it abolishes pyloric spasm and so permitted healing. Lohm (Chenitz) depicted a case of lymphogranulomatosis of the jejunum. Keyser (Groningen) gave the differential diagnosis of endo- and exo-gastric sarcoma of the stomach. Myerson and Ritvo (Boston) advocated benzedrine sulphite for the abolition of spasm during X-ray examination. Donb and Jones (London) described anal pain in malignant tumours of the small intestine. Raydon, Prendergrass, Johnson and Hodes (Pennsylvania University) found that olive oil and glucose inhibit gastric movements; they made interesting observations of the effect of the Polya operation. Abbott and Prendergrass found that morphia had the maximum effect on the duodenum which became the seat of spasm. Bell (Louisville, Ky.) showed that a characteristic deformity distinguishes the cecum and valve in chronic amoebic dysentery. Weber (Mayo Clinic) stressed the importance of thickening, loss of mobility and flexibility as diagnostic of chronic dysentery. Bannum (Zurich) and Blond (Vienna) put forward the view that anal fistulae were actually suppurating hemorrhoids, supporting the view with illustrations. Hicken, Best and Hunter (Nebraska University) used lipolium in tracing biliary fistulae. Ritvo (Boston) found physostigmine useful in the examination of atonic stomachs and benzedrine in driving spasm. Avery (New Brunswick, N.J.) cited a syphilitic stricture of the oesophagus yielding to treatment. Martin (Baltimore) reviewed the literature of gastric diverticulum, a rare condition. Johnson (Baltimore) gave the differential diagnosis of prepyloric conditions, the site of 75 per cent. of carcinoma. Smith (San Francisco) visualised the crescentic indentation of the duodenum in Billroth's

pyloric hypertrophy Rigler (Minnesota University) compared the appearances of scirrhus and generalised leukemic disease emphasising the beneficial effect of therapy in the latter Cole and Pound (New York City) gave a striking demonstration of changes in the small intestine in enteritis migrans mesenteric thrombosis and adenitis Weltz worked on similar lines Ruckenstein (Innsbruck) depicted ascaris lumbricoides Knothe (Berlin) considered the development of ulcerative colitis in its three phases in mucosal radiographs Weber (Mayo Clinic) contrasted the sharply defined nature of carcinoma of the colon with the more diffuse lesions of inflammations Schlechter found calcified mesenteric glands in 2 per cent of all abdomens examined

1937 Lust (New York City) described a symptomless stomach present in an inguinal hernia Nell (Göttingen) studied duodenal ileus and Martin and Elkin (Atlanta) congenital atresias by gas and fluid levels Jellen (Los Angeles) gave differential diagnosis of terminal ileitis Sarasin (Geneva) produced some beautiful pictures of colonic mucosa by double contrast with thorium dioxide Reeves and Harrison (Durham N.C.) revealed the value of pancreatic extract for Hirschsprung's disease Kenning and Lofstrom (Wayne) also Scheibel (Copenhagen) advocated the use of pitressin in eliminating gas in the abdomen the best time being half an hour after administration its danger in cardiac disease is stressed Iazen and Pfeffer (Rhone Wis.) dilated the œsophagus in cardiospasm with an opaque inflator bulb Stocker (Argentine) Schindler and Templeton (Chicago) and Golden (Columbia University) advocated a combination of gastroscopy and radiology in the diagnosis of gastric conditions Gutmann Beauregard and Hartel (France) demonstrated a case of acute gastric œdema simulating carcinoma Prevot (Hamburg) did some useful work on the stomach after operation Aguzzi (Pavia) described celunocœcus cysts of the abdomen Schliffer recommended plain radioscopy of the abdomen insufflation of the colon opaque meals and enemas and urography in all cases of obscure abdominal tumour

1938 Scott and Burroughs (Rochester) considered that between 10 per cent and 20 per cent of chronic gastric ulcers are or become malignant the treatment of large ulcers must be continued until they have healed radiographically and not merely freedom from symptoms White (Fort Worth Texas) found that persimmons constituted the commonest phytobezoar they occasioned filling defects like carcinoma but were movable and capable of being broken up Steiner (Berlin) devised a method of showing the exterior of the stomach wall a useful finding in carcinoma McCowan Knepper Walters and Snell (Mayo Clinic) proved that duodenal spasm was set up by the exhibition of morphia resulting in spasm of the biliary apparatus thus accounting for the accentuation of pain in biliary colic when morphia is given (It would be interesting to study calcium salts in this connection as they relieve biliary colic—A.P.B.) Lsguerra Gomez (Columbia University Bogota) found that amœbic infection caused induration and saw tooth contours in the cœcum and colon Hall (Toronto) found a greatly dilated sigmoid in the right abdomen valve like obstruction distal to dilatation and normal mucosa distal to the loop to be pathognomonic of volvulus Waters (Baltimore) recommended several cholecystographs before coming to the conclusion that the condition was pathological Beckerman and Pörkin (Hamburg) succeeded in visualising the liver and spleen by means of esters of Iodine Pohl (Vienna) revealed puckering of the lesser curvature of the stomach due to pancreatitis Beutel (Prague) produced radiographs of the œsophagus after swallowing of corrosives Palmer Schindler and Templeton (Chicago) studied the history of fourteen gastric ulcers a valuable contribution Velde (Griefswald) studied the relationship of pernicious anemia polypi and carcinoma Hoyer (Aker) showed the value of the straight radiograph in diagnosing intestinal obstruction by means of fluid levels and collections of gas

1939. Hubeny (Cook County Hospital) dealt with extra-alimentary lesions causing filling defects. Skinner and Waters (Mayo Clinic) diagnosed a Meckel's diverticulum, the seat of a leiomyosarcoma. Eleven adult cases of intussusception, caused by carcinomas in seven instances, were portrayed by Schatzki (Boston), a central fine canal with thin peripheral sheath is characteristic, often no opaque medium is needed. Nathanson (Brooklyn) stresses the importance of the erect position for tumours of the cardia, using the gas bubble to show the filling defect. Renander (Vaesterås) depicted a ruptured colonic diverticulum. Brown and Fine (Cincinnati) gave deformity of the second part of the duodenum, absence of displacement of duodenum and pylorus and no widening of the duodenal loop as very suggestive of carcinoma of the ampulla of Vater. Rodman and Leamm (Pennsylvania University) dealt with heart cases mimicking alimentary disease and vice versa. Åkerlund (Stockholm) depicted a curious radiolucency in gastric ulcers due, he thinks, to the artery in the base. Chamberlin (Pennsylvania University) made important studies in the pattern of the mucosa of the small intestine. Colosimo (Rome) instanced the filling defect of a peach-stone in the duodenum. Cohen and Shay (Philadelphia) by the use of the duodenal tube were able to obtain some good small-intestine radiographs. Menwissen and Sloof found that, where present, the long pyloric canal with narrow calibre was distinctive of congenital pyloric stenosis. Tunning (Manchester) found that in a lateral radiograph, with the patient prone, he was able to diagnose carcinoma of the head of the pancreas. Shanks (London) wrote an excellent account of the duodenum, and an exhaustive account of the appearances found after stomach operations.

1940. Rockwern and Smily (Cincinnati) portrayed calculi in the pancreas in a case of diabetes. Ritvo and McDonald (Boston) found that amyl nitrite, by its temporary relief of spasm in the case of cardiospasm, was useful in diagnosis and bougie treatment. Phlegmonous gastritis was depicted by Cutler and Harrison (Peter Bent Brigham Hospital). Singleton (Toronto) showed a volvulus of the stomach, proved at operation. Weher and Good (Mayo Clinic) produced radiographs of such clarity that the invaginated stump of the appendix was visible. Schatzki (Boston) discussed the difficulty of diagnosing between diverticulitis and carcinoma, a difficulty heightened by the liability of malignant change in the former. (Many cases of successful colectomy specimens of malignant disease among older museum jars are in reality cases of diverticulitis—A P B.) Ettinger (Boston) pleaded for an upright position in gall-bladder study. Bernard (Gussen) pictured a choledochoduodenostomy. Case (N. W. University) dealt exhaustively with the radiology of pancreatic disease. Bade (Kiel) stressed the difficulties in improving the results of operations for stomach cancer. Eustermann (Mayo Clinic) dealt with the early signs of this disease. Law (Michigan University) watched megacolon diminish in size with the exhibition of acetylbutamethyleolme.

1941. On clinical grounds Bertwistle (London) suggested that there was a reflex emptying of the gall bladder with defecation; if proved, its importance in cholecystography is obvious. Cameron and Bresch (Minn., N. D.) analysed the literature of sarcoma of the stomach, 2 per cent. of tumours of this organ. Schmitt (Gussen) dealt with cancer of the jejunum and Holden (Columbia University) with abnormalities of the small intestine due to malnutrition. Rutting (Breslau) found Bihse's lesion of great value for cholecystography. Keenig and Force (Oakland, California) gave a filling defect, rigidity of the wall and areas of ulceration as characteristic of Hodgkin's disease of the stomach.

1942. Samson and Force (Oakland, California) radiographed and injected through an œsophagoscope—low œsophageal varices. Peterson (Charleston, W. Va.) radiographed a syphilitic stricture of the œsophagus, successfully treated by specific medicine. Seesell, Peterson and Hodges (Richmond, W. Va.) dealt with neoplastic mimics in the "gas bubble."

of the stomach. Kiklin (Mayo Clinic) investigated the tuberculous scapulae of a cancerous ulcer of the stomach; early cancer is also dealt with by Eastermann (Mayo Clinic). Reynolds (Boston) fastened a syphilitic stomach responding to treatment. Wick, Hawks and Baker (University Illinois) showed up appendicitis abscesses by fluid levels. Caffell (Mayo Clinic) gave indications for closure of the stomach. Wilco (Mayo Clinics) studied the occult tuberculous. Perry and Carpenter (Mayo, Pa.) showed the need for staphylococci in the stomach. In cases of enteric cancer polidiodides. Lehman (University Virginia) found a case in which the head of the pancreas constipated the duodenum. Wu and Jacobs (Chicago) found cancer of the esophagus to be common in N. China and were particularly successful in treating it. Hinkel (Columbia University) dealt with the direct methods of diagnosing the anterior system.

1914. Sailer and Thompson (Boston) found hemorrhage to be an almost constant finding in intestinal granules of the stomach. Lyman and Miller (M. V. A. B. C.) showed how food again affected the process of the small intestine. Jenkinson and Brown (Chicago) demonstrated the effect of tuberculous on the rectum and polypoid. Hoffman, Zimmerman and Arns (Chicago) prepared radiographs of the biliary apparatus during operation. Paul and McNee (New York) reviewed the end results of postoperative cancer. Sweet (Boston) illustrated his transillumination apparatus for high postoperative at avoidable lesion in the esophagus. Reynolds of the small intestine even in Richard (Boston) obtained stilling pictures of the tuberculous rectum and intestine. Nathan (Columbia N. Y.) fastened a case of intestinal obstruction due to a gall stone. Zimmerman and Lyman confirmed much of the stalling work of the cancerous dyspepsia, giving the prognosis of the nine types. Whiting and Bowman (Boston) found lateral views of the colon invaluable. Helmer (Columb.) advanced the technique of tuberculous tumors under radiographic control claiming that 80 per cent. need no surgical intervention.

1914. Hale and Schuchat (Boston) and Lindsay, Templeton and Hallman (Chicago) observed the delay in peristalsis produced by cancer and dyspepsia in cases of tuberculous. Lacey and Marshall (New York) showed the value of radiology of the stomach in avoiding fruitless operations. Helke (Milwaukee) used Priblitz on the gall bladder and got 87 correct diagnoses. These results were borne out by Meyer and Pyburn (San Francisco). Helke (Milwaukee) stressed the value of the operating time of the pylorus in cases of the painful pyloric stenosis, some function should pass within five minutes of ingestion. Brown (Columbia Texas) showed a case of emphysema of the gall bladder. Bland (Columbia) showed how postoperative could radiate cancer. Hickey and Mitchell (Boston, N. Y.) distinguished between inflammation and cancer of the pylorus.

1915. Vaughan (Michigan, N. Y.) concluded the X-ray and postoperative that control postures. Nelson (Brooklyn) and Harris (New York, Pa.) demonstrated similarity between cancer and cancer of the stomach. Wiles, Kaplan and Lacey (perforated gastric and cancer). Hartley (Massachusetts) discovered a perforated stomach in an ingested foreign body. Lamb (London, N. Y.) showed the effects of on the lower intestine, rectum and ascending colon. Leonard and Anderson (Boston) for the first of the stomach as a means of investigating the liver and spleen. As found the radiograph of use in carcinoma with cholecystography. Fisher (other cases of dyspepsia depicted an excellent case of acute vomiting. H. A. J. showed that with muscular dyspepsia elevation of the right hand of a sometimes locally with flattening of the radiographic made and the other extensions were common findings. An interesting approach to the treatment of cancer is by using the distance of a thermometer in the mouth, the distance of the heated infant. Vautz, La and Paul (both 1915).

which is situate at the union of fore-gut and mid-gut in our embryonic times. Golden (Columbia Univ.) enlightened some of our ignorance by publishing *The Radiologic Examination of the Small Intestine*. Brown described a chronic regional, sclerosing enteritis. Druckmann and Schorr (New York) and Golden and Ducharme (Columbia Univ.) made interesting studies of amœbic dysentery, the cure of which is an outstanding success of medicine, especially so at this time, when the disease is so rampant among those returning from the Far East, the healing process is well seen in radiographs. Volvulus of the sigmoid is characterised by enormous gaseous distension so that the abdomen seems filled with it (Waters and Firor). Rousseau and Morris (Winston-Salem, N.C.) showed how useful the presence, position and movement of gas were in study of the acute abdomen, a straight film being used, working in Hull, Banner dealt with the same subject.

1946 Nunez and Pucviro (Cordoba) watched the resolution of tuberculous ileum and cæcum. Holt (Univ. Mich.) showed the indentation of the stomach by a cyst of the pancreas, whilst Goldyne and Carlson (San Francisco) described duodenal obstruction by an annular pancreas. Johnstone (Harrogate) described a post-circoid skew which can cause dysphagia. Harper (Glasgow) depicted a corkscrew œsophagus and Grossmann (London) two cases of achalasia treated by acetylnitrate. Benedict (Boston) analysed 245 cases of gastric disease, comparing the X-ray findings with those of the gastroscope, microscope operation and post-mortem appearances. The small intestine was once thought to be unsuitable for study, but Tennent (Birmingham) using the Miller Abbott tube and small intestine enema, got interesting results. Windholz (Stanford Univ.) gave the signs of retroperitoneal lipomas. Stephen (Emory Univ.) considered the formation of gas in peritoneal abscesses. Present (M.C., A.U.S.) reported on two cases of aberrant pancreas. Levitt (M.A., A.U.S.) summarized the findings of the "scout film" (plain Radiography) - it may reveal many unsuspected conditions. Johnson (Edinburgh) gave the incidence of œsophageal diseases met with at the different decades. Duodenal septum was described by Lamson, its rarity is surprising since one would expect the union of fore and mid guts to be the seat of occlusions more often. A rare accident, perforation of a duodenal ulcer during X-ray examination, was recorded by Schilling (Rochester), bannum was scattered throughout the abdomen four months later. Beguiré (Havana Univ.) and Spies (Univ. Cincinnati) showed the emative effect of synthetic folic acid in sprue. Tisceno (Glasgow), Rilyo and Laurence (Boston) recorded their experiences with volvulus, curved densities alternating with radiolucencies being pathognomonic. Ehrenpreis (Stockholm) detailed ten cases of megacolon - the disease starts at birth. McLaughlin (M.C., A.U.S.) found choledochus cysts to be congenital maldevelopments of the common bile duct.

1947 Love (London) advocated the use of chatherny for cholecystectomy, since no drainage is required, whilst operating lipiodol is injected into the common bile duct and the film is developed immediately. Arcudi and Wolf (Chicago) found that filling of the vallecula of the larynx was a point of value in cases of dysphagia from neurosis. Alenbrauser and Bernenberg (Harvard) found vomiting from cardio-œsophageal reflux to be non-projectile. Wehn (Stockholm) showed how œsophagitis could mimic neoplasm. Cottell, Neuchill and Ricketts, Kirsner and Palmer (Chicago) showed how thickening of the stomach wall could resemble cancer. Mearsch and Knifm (Mayo Clin.) found radiology more accurate than gastroscopy. Hodes (Philadelphia) and Mammoer (Chicago) investigated early amœbic dysentery. Helen White and Coray (Univ. Pitt.) produced striking pictures of the biliary and pancreatic duct systems by injecting diodrast into the gall bladder whilst operating. Mirza (Cordoba) found cholangiography excellent for detecting stones in the ducts or at the ampulla of Vater.

URINARY SYSTEM

1896 In the advance of Radiology the urinary system has ever been in the foreground. As early as July a vesical stone had been seen and measured by several workers and Mac Intyre (Glasgow) had discovered calcareous degeneration in a tuberculous kidney. Kummel and Walstein (Munich) successfully demonstrated the first renal calculus.

1899 Leonard (Philadelphia) showed eleven cases of renal stone by the New Photography.

1902 Leonard (Philadelphia) claimed to have made an accurate diagnosis in 98 per cent of 227 cases of renal calculi. As he said: "X rays have simplified and modified operative procedures so that operation can be directed to the site of the calculus, operative trauma minimised and unrecognised stone in the opposite kidney excluded."

1903 In July Hall Edwards (Birmingham) gave a masterly review of the present position of radiology of calculi.

1905 Voelcker and Iichtenberg produced the first cystograms using collargol as the medium. Almost simultaneously we find Hall Edwards and Icedlum Green (Birmingham) using bismuth to study the mechanism of micturition. (Their medium was not above reproach.) Jacob emphasised the importance of calcified mesenteric glands in the differential diagnosis of ureteral calculi. Evidently the enthusiasm of the pioneers was outstripping their wisdom as we find Hurry Lenwick (London) and Cole (New York) warning us against diagnosing stone in all cases of shadow in the renal area.

1908 Haensch (Hamburg) confirmed Strater's observation that it is often possible to see the shadow of the kidney itself. He detected a papilloma of the bladder by means of a cystogram. Cole (New York) pronounced Roentgen rays are the most accurate method of examination for stone.

1910 Though not the first to obtain a pyelogram the credit for putting this on a sound basis must be given to Brunsch (Vienna). He now published some of his earlier work which was elaborated and issued in book form in 1915.

1911 A. I. Gray gave an interesting account of the distinguishing features of ureteral and appendicular calculi.

1912 Case (Chicago) strongly advocated the stereoscopic X rays for the diagnosis of calculi. Thurstan Holland (Liverpool) rightly recommended radiology for its safety, painlessness and general reliability and advised it as the first method of examination of the urinary tract before sounding or cystoscopy.

1913 Arcehin and Rafin (Lyon) showed how the radiograph indicated whether nephrotomy or pyelotomy should be done for calculi.

1916 Peterkin demonstrated a diverticulum of the bladder always a difficult problem even with the cystoscope.

1917 Iotsy detected calcareous deposits in the bladder in bilharzia.

1918 Millerton (Belfast) found the opaque catheter of very great service in localisation of bullets. Kretschmer (Chicago) detected prostatic calculi.

1919 Pfahler (Philadelphia) diagnosed a vesical tumour the size of a thumb by means of gas in the bladder.

1920 Young and Waters (Baltimore) injected collargol to determine patency of the ejaculatory ducts and vas deferens in cases of sterility.

1922 Thomson Walker (London) gave an excellent account of the present position of pyelography: he always used 20 per cent sodium bromide. Kretschmer (Chicago) drew attention to the prevalence of bone metastases in cancer of the prostate.

1923. R. R. Graham (Canada) pointed out that perinephric suppuration was often detectable as a shadow beyond that of the psoas muscle. Caulk (St Louis) found that as many as 27 per cent cases of renal and ureteral calculi had undergone appendicectomy, he advocated X-raying all obscure abdominal conditions for calculus before operating. Thomson Walker and Knox (London) wrote an excellent article on the differentiation of biliary and renal calculi.

1924. Nichols (U S A) gave a good paper on the stages of hydronephrosis. Barclay (Manchester) investigated a case of large uric-acid calculus which, being pure, cast no shadow.

1925. Cave and Johnstone (London) described the radiographic changes in the male urethra.

1930. Though Rowntree (Mayo Clinic) had shown that it was possible to obtain pyelograms by intravenous administration of sodium iodide, it was not until this year that uroselectan was introduced by von Lichtenberg (Berlin). It is a most satisfactory method, since it involves no surgical skill such as is required for retrograde pyelography, and is free from trauma to the ureter, moreover, it gives indications of functional activity.

1931. Magnusson (Stockholm), working on that *bête noire* of all abdominal work, gas, considered that it was largely swallowed air, which he found took ten minutes to traverse the small intestine, and thirty minutes for the whole tract. Mezger on the other hand used a cellulose splitting enzyme, *linzm*, considering that gas is due to intestinal fermentation. Clarke and Bailey (Atlanta, Georgia) record a remarkable case of a prostatic valve in a child which responded to treatment.

1932. *Urological Roentgenology* was published by Young and Waters (Baltimore), a most valuable contribution. Twinn (New York) showed the value of the excretion urogram in cases of calculi. Patch and Rielue (Montreal) found in the excretion urogram a valuable addition to, but not a substitute for, the retrograde method. Kornblum, discussing some of the poor results of the excretion pyelogram, stated that the concentration of iodide is halved. He found it a great help to use a compression bag as soon as the shadow begins to appear. Blurring of the shadow is due to pulsations of the renal and hepatic arteries, the aorta and the heart. He found the erect posture, in spite of poorer definition, to be of great use in the investigation of kinks and in determining the position of the kidney. Visualisation of the pelvis was proof of function, no matter how poor. Plaggenmeyer and Weltman recommend screen examination of the pelvis, considering it as important as in the case of the stomach.

1933. Braasch (Mayo Clinic) made a strong plea for the routine use of excretion urograms in all obscure abdominal conditions, he showed that often kinks discovered by the retrograde method were actually sites of spasm, disappearing in the excretion urogram.

1934. Swick (New York) found that it was possible to obtain an excretion urogram with hippuran per os in half the cases examined, this method would seem to be a great advance. Abth (Carro) gave a masterly account of bilharzial infection of the bladder and urinary tract, the calcified larvae being beautifully seen.

1935. Waters (Baltimore) considers obliteration of the psoas shadow and *colon flexus* very suggestive of perinephric abscess. Nichols (Cleveland) in an analysis of renal tumours found Grawitz tumour the commonest, followed by carcinoma arising from an adenoma, primary sarcoma was rare. He agreed with Lwing in finding 50 per cent. tumours of the renal pelvis to be papillomas with a tendency to malignant change, and 25 per cent. to be epitheliomas, squamous carcinoma was rare but rapidly fatal, he found perinephric pyelograms of the greatest service, as did Jansson (Helsingfors). Abth (Baltimore) stressed the importance of using a pyelographic fluid compatible with the blood capillary

in traumatic conditions of the kidney Beer and Theodore (U.S.A.) found that neoskiodan could be injected subcutaneously a feature in urograms in children Jarre and Cumming (Detroit) by means of rapid serial pyelograms were able to visualise peristalsis in the renal pelvis finding it to be rhythmical depending on contractions of the pelvic sphincters Akerlund (Stockholm) and Ienk (Vienna) pointed out the possibility of investigating ureteroceles by excretion urography the former diagnosing a stone in one such Dobrzabicki and Grabowski (Iwów Poland) found the excretion urogram of great service in working on urogenital fistula especially those occurring post partum Eichler (Stettin) advocated the use of a mildly irritating contrast medium for pyelography using umbrenal he reduced his extravasations from 6.8 to 1 per cent Janker (Bonn) depicted calcification of the seminal vesicles and gave their diagnosis from vesical stone

1936 Shrimbaugh (Peter Bent Brigham Hosp.) discovered changes in the renal pelvis due to extrarenal growth Crev Turner (London) and Sunt (Newcastle) studied the effect of ureteral implantation in the colon Junglinns (Frankfurt) was able to prepare some excellent pictures of the seminal vesicles by injecting the vas with iodopin during sterilising operations Heinhiser and Strnad (Prague) dealt with the pyelography of perforations of the renal pelvis and ureter Beer (New York City) determined the amount of residual urine by observing what was left after intravenous pyelography Heitz Boyer (Paris) demonstrated the lengthened bent and strongly deflected urethra in prostatic enlargement Higgins (Cleveland) depicted a carcinoma implanted on a diverticulum profuse hæmaturia proved a sign Campbell (New York City) found congenital stricture of the ureter to be situated at the uretero vesical junction in two thirds and at the pelvi ureteral junction in one third of his cases

1937 Kretschmer (Chicago) advocated the use of intravenous pyelography in children for hydronephrosis the commonest congenital affection Heckmann (Heringsdorf) demonstrated lymphatic absorption of contrast medium in urography Thompson (Mayo Clinic) dealt with prostatic abscess Mathe (San Francisco) showed fixation of the kidney to be the most constant sign of perinephric abscess Menville (New Orleans) by means of lateral exposures demonstrated anterior displacement of the kidney in perirenal abscess

1938 Jennings Marshall and Shanks found the intravenous pyelogram superior to the instrumental in study of hydronephrosis They gave elongation of the calyces encroachment on the pelvis secondary pyelectasis displacement of the kidney and deformity of the pelvi ureteral junction and upper ureter as typical of hypernephroma They defined tuberculous disease as miliary ulcer cavernous pyo or hydro neptosis or caseous Jennings Marshall and Shanks contribution to *A Text Book of X ray Diagnosis* was outstanding Goldstein and Abeshouse (Baltimore) classified calcification of the kidney as being due to (1) excessive outpouring of calcium—e.g. fibrocystic disease (2) acute and chronic inflammation (3) abscess formation often tuberculous

1939 Jewett (Boston) studied the effects of accessory renal arteries and strictures Elmer and Wengarden (Chicago) found that acute spontaneous hæmatoma was usually fatal but with the chronic hæmorrhage recovery was the rule Weber (Vienna) dealt exhaustively with tuberculosis of the genito urinary system Hutter (Vienna) pointed to the errors in diagnosing pyelitis due to spasm Astraldi Brea Vasi and Torroba (Italy) depicted a reno bronchial fistula Nesbit and Douglas (Michigan University) reported good results from the injection of diodrast subcutaneously in children Dittmar (Lyebeck Germany) drew attention to spasmodic scoliosis in renal disease Hunner (Baltimore) dealt with drainage of polycystic kidneys Rexford (Chicago) by the use of sodium iodide was able to reveal rupture of the bladder it occurred chiefly among drunkards Lind Zigle and O Dowd (St Louis) demonstrated the radiolucent ring round the bladder in

are only now being appreciated. Walsham (London) noted calcareous nodules in tuberculosis.

1906 Stanley Green (London), another pioneer, complained that "Radiology of the chest has not evoked the amount of interest and earnest work among radiologists that by, for one, had hoped." He pleaded for close co-operation of clinician and radiologist—words which ring true even now. He considered "Radiology is an aid to the clinician in the same way as the ophthalmoscope is to medical diagnosis." Walsham and Orton (London) published *Röntgen Rays in the Diagnosis of Diseases of the Chest*, which the reviewer described as the "work of a practised physician and an expert radiologist—an ideal combination."

1908. Lohmstein demonstrated lung tumours. Wenchbach (Grönningen), by systematic study of stereoscopic radiographs, advanced the view, recently reintroduced, that tuberculosis starts in the bronchial glands and not in the lung apex, where clinical signs due to deficient air entry, first manifest themselves.

1909. To Rieder and Ziessen (Munich) is due the credit of bringing the plate into its proper position in chest work by their adoption of the "flash" exposure, executed by means of double intensifying screens. Holzknecht (Vienna) reported a case of dislocation of the mediastinum, a condition well recognised in modern chest surgery.

1912. Berthebroth reported cases of hydatid cysts.

1913. Balvay and Arcehn (Lyons) demonstrated the almost indispensable value of X-rays in conducting artificial pneumothorax—"the pathology of the living." Bythell (Manchester) showed the superiority of X-rays in the diagnosis of certain forms of phthisis in children. Stanley Melville (London) made the important statement that "Radiography affords the earliest evidence of pulmonary tuberculosis and usually demonstrates a more widespread extent of infiltration than is suspected by clinical examination." He confessed that we were behind other countries in our use of radiology as an aid to early diagnosis of pulmonary tuberculosis. Lercy (Hamburg) described diaphragmatic hernia, which was also studied by Griffin. Beclère (Paris) obtained radiographs of gangrene. Neuhuis (Frankfurt) demonstrated tuberculous bronchial glands.

1915. Walsham and Orton (London) classified phthisis according to the X-ray appearances and confirmed Williams's sign.

1916. Carman (Mayo Clinic) proved the frequency of metastatic deposits in sarcoma and carcinoma in the lungs.

1917. Moore (Washington) classified the types of bronchiectasis and suggested that they were probably stages in the disease. Stewart (New York) showed the difference between the opacity of pneumoma, which is wedge-shaped, and that of empyema and pleural effusion. Pancoast (Philadelphia) classified tuberculosis of the lung into the parenchymatous, peribronchial and hilar forms. Pfahler (Philadelphia) gave a good account of the surgical complications of the chest and the potencies of X-rays.

1918. H. J. Walton gave an account of the radiology of the chest.

1919. Otten disproved the view then held that sarcomas outnumbered carcinomas of the chest. Wessler studied the changes in bronchiectatic cavities with alterations in position and degrees of inspiration. Homer (Japan) worked on post-influenza pneumonia. Bowman, working in Chevalier Jackson's clinic, proved that many cases of dilated bronchi were actually due to inhaled foreign bodies.

1921. Lynah and Stewart used emulsions of bismuth to study bronchiectasis.

1922. Barkitt (London) described a case of spontaneous pneumothorax. Sutherland (Pretoria) revolutionised our ideas of bronchiectasis by showing that it was easily possible to cast the whole bronchial tree with lipiodol.

1923 Jacobeus (Stockholm) detailed the technique for division of pleural adhesions with the cautery a great improvement on simple cutting Stewart (New York) investigated pulmonary abscesses Childs (New York) gave an account of the differential diagnosis of thoracic tumours Haudek (Vienna) described the intrathoracic growths of Hodgkin's disease Sante watched the resolution of 150 cases of pneumonia analysing the lobes affected oftenest Crover Christie and Merrit instanced a case of fibrosis following radiation of a breast sarcoma which soon recovered

1924 Sante continued his work on pneumonia giving the six modes of attack of influenza at times bronchial carcinoma was simulated

1925 Morriston Davies (Ruthin) gave an excellent paper on "The Importance of Radiology in Connection with Intrathoracic Surgery" at the First International Congress of Radiology in London

1926 Boehm (Munich) watched resolution of pulmonary infarcts Manges (Philadelphia) showed the possibility of localising non opaque bodies in the bronchi by changes in the lung involved particularly atelectasis Sicard published further work on the bronchial tree Sparks (London) Jacobeus (Stockholm) and Chindler and Wood (London) reported work on the injection of lipiodol

1927 Assmann (Berlin) described the primary focus of phthisis as a well defined rounded shadow seen in the left infra clavicular region situate in the posterior part of the lung This was a very definite milestone

1928 Anderson (Otago) gave a masterly account of hydatid disease

1930 Morriston Davies's *Surgery of the Lung and Pleura* appeared containing many valuable radiographs

1931 Sparks and Wood (London) described a method for localising pleural adhesions Mackenzie (Melbourne) advocated the use of lipiodol in tuberculous lesions even claiming that it has some therapeutic effect Ude (Minneapolis) in his analysis of 120 cases of pneumonia found the postero medial part the commonest to be affected he made a comprehensive list of chest diseases suitable for X ray examination Einer and Kastermann (Germany) showed that a miliary deposit in influenza, as in all other diseases was a grave sign Head (Chicago) pointed out the similarity between acute bronchial fistula and pulmonary abscess and that between the chronic form and bronchiectasis Brown (Cincinnati) stressed the value of the fluoroscope for diaphragmatic movements Mouriquand and Savage (Lyons) emphasised the importance of a triangular area in the silent pneumonia of children

1932 Weiss and Biermann (Prague) diagnosed an intratracheal tumour which was removed endoscopically Hess and Falitsek (Germany) gave constipation of the Stierlin type—i.e. affecting the ascending colon—as an important early sign of carcinoma of the bronchi considering that like asthma laryngeal spasms and functional heart it has its origin in the sympathetic chain Lesser (Germany) showed how senile changes in the lungs simulated tuberculosis Mendelsohn (Illinois) studied phthisis in accordance with the findings of the National Tuberculosis Association Coe and Otell (Washington) watched a case of pulmonary oedema clear in forty eight hours Manges (Philadelphia) drew attention to the febrile nature of bronchial carcinoma Haudek (Vienna) gave some useful examples of cases in which disease in the thorax originated in the abdomen and was unsuspected Cindrick (Detroit) distinguishes between tuberculosis starting in infancy and that starting in adult life the former tends to regression the latter to progress of the disease Willi (Vienna) showed the specific nature of pneumonia following measles the greater the number of spots and bands on the lung the worse the prognosis Kearney (New Orleans) advocated bronchoscope drainage for pulmonary abscess Tilher (Paris) investigated the

phases of hydatid cysts. Lassen and Isagen, after a careful study of 100 cases of plithisis, declared that X-rays were the most reliable. Beutel (Prague) diagnosed papillomatosis of the larynx and bronchi. Farrell and Flick (Philadelphia) investigated pulmonary abscess, bronchitis and neoplasm. Farnas (Havana) recommended serial radiographs for the detection of early bronchial carcinoma, a disease which is apparently increasing. Lenk (Vienna) described "open honeycomb" lung. Schurz stated that two-thirds of inhaled foreign bodies were radiolucent.

1933. Graham Hodgson (London) showed how the four types of pneumonia revealed hilar changes initiating the process.

1934. Ringler and Exner (Minneapolis) and Sampson and Brown (New York) stated that, after the tuberculin test, X-rays offered the earliest diagnosis. Herriman and Altschul (Asbury Park, New Jersey) worked on fusospirochetal infections of the lung, which they found to be commoner than generally supposed. Chevalier Jackson (Philadelphia) published *Foreign Bodies in the Air and Food Passages*, in which he emphasised the value of radiology preliminary to the bronchoscope.

1935. Tudor Edwards (London) depicted a number of lobectomies for bronchiectasis. Anspach (U.S.A.) considered the triangular basal shadow in children as due to atelectasis, predisposing to bronchiectasis. Halbe (Milwaukee) confirmed Brown and Sampson's view that few cases developed plithisis who had normal radiograms up to the age of twenty-five, in a series of 1000 examinations. Round shadows in the chest are usually due to benign tumours or sarcomas according to Udvardy (Debrecen) who also studied pleural exudates due to abdominal disease. The tomograph was invented in Germany, the principle involved being the rotation of the film in such a manner that the part under suspicion receives the full exposure, the rest of the field only part. Opie (Cornell University) gave an admirable account of the value of X-rays in diagnosis of plithisis. Vivoli (Buenos Aires) described syphilis of the lung as producing a gummatous pneumonia or bronchitis. Robinson also studied this condition. Zefferfel (Basle) depicted diaphragmatic elevation associated with infarction.

1936. Doig and McLaughlin found that the mottling of iron-ore-dust workers promptly subsided. Fleischner (Vienna) gave two causes for atelectasis, compression and obstruction. Grömeder (Berlin) was enthusiastic regarding the use of the tomograph for bronchial carcinoma and lung abscess. Belot and Peuteuil (Paris), Claessen (Rosljwjk), Tiller, Genssel and Gornard (Paris) studied changes in hydatid cysts. Levy (New York) depicted infarcts in a case of failing compensation and gave the differential diagnosis from neoplasm. Fleischner (Vienna) studied paradoxical shadow formation in artificial pneumothorax. Holz (Basle) described three cases of pneumothorax in the new-born. Richhoff jun. (Baltimore), worked on the effect of total pneumonectomy on the remaining lung. Fisher (New York City) instanced a case of mediastinal abscess which recovered. Kerley (London) described the three stages in emphysema. Vivoli (Buenos Aires) described syphilis of the lung as causing bronchitis, then bronchiectasis. Graham and Singer (Washington) observed three cases of lung abscess simulating new growth. Phenister, Steen and Voldrauer (Chicago) consider the radiolucent layer of fat floating on the upper surface as pathognomonic of dermoid cyst.

1937. Beutel and Strind (Prague) analysed 200 filling defects in bronchogram. Bonard (Zurich) detailed two cases of chylothorax. Uspensky (Moscow) watched a lung carcinoma under treatment for eight years. Soederlund (Stockholm) depicted two tumours of the diaphragm. Canoyt (Strasbourg) advocated tomography for lung neoplasms. Jennings (London) watched the resolution of atelectasis. Maistri and Silovsky (Luzern) discussed the import of haematemesis in tuberculous subjects. Case of tuberculous

recovery were reported. Boulatschenko (Kharkov) watched the onset and resolution of pneumonia. Nathanson (U.S.A.) called attention to the increasing number of cases of pleurisy as the result of X ray therapy, a condition which rapidly clears up but which is liable to be mistaken for metastatic disease. Hopkins (Pennsylvania University) declared that spontaneous pneumothorax was commoner than generally supposed. Daniello (Rumina) described a left diaphragmatic pleurisy. Jenkinson and Roberts (Chicago) classified 100 diaphragmatic herniae which had come under their notice.

1938 Tudor Edwards (London) and Tylor (Birmingham) performed successful lobectomies for endothelioma of the lung, a disease causing a homogeneous and sharply demarcated shadow. Schilling and Kuhlmann (Munster) discovered a case of porocephalosis, a snake parasite. Smith (London) stressed the irregular nature of the shadows of pulmonary infarcts. Fawcett (Ulverston) found that the moulds growing on hay and corn and manure often produced conditions mimicking tuberculous disease, at the outset these conditions clear up with potassium iodide. Brunner (St. Gallen) recommended an extra pleural pneumothorax for certain bad risks. Todd and Cross (Boston) dealt with bronchial vestiges. Taylor (U.S.A.) continued his work with the tomograph, which he found to be of the utmost use in cavity localisation. Cohen (Jersey City) found the numbers of unresolved pneumonia and tuberculosis to be close. Cross (Bad Nauheim) found osseous deposits in the lungs in tuberculosis. Dahm (Cologne) dealt with superior pulmonary sulcus tumours first described by Pincoast. Pearse (Rochester) reported on eleven cases of mediastinitis due to cervical infections. In his *Text Book of X ray Diagnosis* Twining (Manchester) described the tendency to lung abscess in Friedlander's pneumonia, the first sign was a gas bubble. He dealt with tumours pressing on the trachea and had studied over a hundred cases of asbestosis. This silicate of magnesium caused a ground glass appearance, soft fuzzy edges unlike silicosis. He clarified much concerning osteoarthritis.

1939 Smiley, Showacre, Lee and Ferris (Cornell University) described acute interstitial pneumonitis, opaque patches giving no clinical signs, appear and soon resolve. Bromer and Wolman (Pennsylvania University) related cases of lipid pneumonia in infants, the result of the entrance of oily substances into the lungs. Monaldi (Rome) advocated suction drainage for cavities, depicting some of his cases. Crilli (Rome) portrayed a chest the seat of multiple neurofibromatous tumours, others were present in the pelvis. Broeck's sarcoid and generalised sarcoidosis were detailed by Reissner (New York). Lung secondaries were almost the rule. Martin (Texas) confirmed the extreme radio sensitivity of tumours of the nasopharynx. Wunzer (Mayo Clinic) instanced five cases of bilharzia involving the lungs. Nicholson (Hale, Cheshire) found that amylnitrite did in fact cause dilatation of the bronchi.

1940 Clerf (Jefferson Medical College) found that foreign bodies obstructing the air passages were usually non-metallic. Andrus (London, Ontario) gave the following criteria for bronchiectasis diagnosis in the straight film: (1) general increase in pulmonary markings, (2) ring shadows, (3) displacement of organs, and (4) chronic pneumonia. Hodges (Michigan University) watched a syphilitic foot and pneumonia clear up under specific treatment. Fisher and Finney (Baltimore) showed cases of lung abscess. Fallon (Dublin) showed the frequency of lung injury as revealed by X rays. Nesbit and Dick (University, Michigan) studied the pulmonary complications of renal suppuration.

1941 Gilbraith (Australia) and Webster (Melbourne) dealt in exhaustive fashion with mass routine examination of army recruits, a survey which will have valuable results. Paul (University, Wisconsin) made a study of acute bronchiolitis in infancy. A good classification of pleural effusions was laid out by Rigos (Rochester, Minn.). Vieta and Craver (New York) worked on the chest effects of Hodgkin's disease. Winn (Springfield, California) noted excitation in coccardial infection. Ogilvie (Newcastle on

Tyne) dealt with the development of bronchiectasis. Nessa and Rigler (University, Minn.) watched the X-ray manifestations of pulmonary edema. Grumbiner and Untler (Chicago) depicted a case of air in the anterior mediastinum in a newborn, which was successfully dealt with by aspiration.

1912, Evans and Beech (University, Minn.) followed up an epidemic of acute pneumonia taking many radiographs. Kerley (London) added enlargement of bronchial glands and benign infiltration of the lungs to the symptoms of erythema nodosum. Hendricks' work contains a good diagram of the points of attack of cancer in the lung. Tarnas (Havana) by lining the mucous membrane of the upper respiratory tract by means of a nasal pharyngeal spray, was able to produce some striking pictures of the larynx and trachea. Ellis, Smith, Bonebroke and Hunter (Wallace, Ida.) found respiratory troubles common, and predisposing to silicosis among miners. Adams (Chicago) published an exhaustive review of pneumonectomies and lobectomies for tuberculosis. Overholt (Boston) stressed the importance of lung cancer, the symptoms of which differed little from those of any other lung affection. Hartzell (Cleveland) worked on hemothorax among healthy subjects.

1913, Hurvey (Rochester) dealt with mediastinal effusions in children. Fetter (M.C., U.S.N.R.) went into the real and apparent increase in lung cancer. Robbins (Boston) dealt with fifteen cases of bronchiogenetic cysts. Stein (M.C., A.U.S.), stressing the frequency with which disease of the lungs is obscured by the heart shadow, recommended the oblique view. Kerley (London) demonstrated enlargement of the bronchial glands in erythema nodosum. Polgar and Lendval (Budapest) studied Pancoast's syndrome, paradoxical breathing at apex.

1914, Hankins (M.C., A.U.S.) found a traumatic hernia in the pharynx of a trumpeter. Owen (Scott Field, Ill.), Needles and Gilbert (Hunter Field, Savannah, Ga.) and Huffard and Applebaum (Toledo) brought much information to light on pneumonitis, it is characterized by rapid development of opacities which disappear with similar rapidity. Adams and Bloch (Chicago) removed a mediastinal hemangioma. Rees-Jones pictured cystic disease of anazygos lobe. Lloyd Rusby (London) showed excellent radiographs of mediastinal dermoids. Pneumonia, pneumothorax and emphysema were the findings of a case of kerosene poisoning, which symptoms gradually subsided (Scott, Louisville). Great attention was paid to mass radiography of chest by the R.A.F. and U.S. Navy.

1915, Jackson and Parker (Harvard) investigated pulmonary Hodgkin's disease. Friedlander (Western Reserve Univ.) made a study of the anterior mediastinum, a favorite site for dermoids and teratomas. Kerley (London) described sarcoid disease to be an indolent affection attacking almost any tissue in the body. Hennell and Sussman (New York) described the transient infiltrates of eosinophilia. Robbins and Hale (Boston) studied lobar and segmental collapse. Mass radiography was dealt with by Behrer, Hilleboe, Long and Yerushalmy (New York). Blair (London) wrote a valuable paper on chest manifestations in abdomino-thoracic injuries; they include tension pneumothorax, interpleural hemorrhage, traumatic diaphragmatic hernia, blast and foreign bodies. Robbins and Hale (Boston) gave useful work on lobar and segmental collapse. Kraus (M.C., A.U.S.) found lung infarcts to be commoner than generally supposed. Tilley, McCormack and Cambier (New York) treated twenty pneumococcal empyemas with penicillin, with only one failure. Schmidt (Denver) advocated pneumoperitoneum in certain lung conditions to induce collapse. Katz and Reed (Washington, D.C.) dealt with mediastinal effusions. Hodges and Wood (M.C., A.U.S.) described eosinophilic bronchopulmonary condition. Mathes-Cornat (Bordeaux) illustrated carcinomas of the bronchi and trachea. Montano (Mexico) found that in 80 mediastinal tumors 60% were affections of the lymphatic system which are usually radio-sensitive especially lymphatic metastases.

1946 McDonald and Ehrenpreis (MC AUS) pointed out that primary atypical pneumonoma usually involving the base is either circumscribed when it is benign or disseminated when it is more serious. According to Soderman and Stuart (Tulane) lipiodol pneumonoma is of increasing incidence. Overhold and Wilson (Boston) stressed the importance of distinguishing between quiescent and active tuberculosis and the value of serial radiographs in bronchial carcinoma for which Irimann Dahl (Oslo) found tomography invaluable. Lodge (Sheffield) wrote a masterly thesis on the lung markings which should be read by all interested in lung topography. Zwerling and Palmer (USPHS) studied lung calcification in relation to the histoplasmosis and tuberculosis tests. Cerstl Warring and Howlett (Hartford Conn) investigated lung cancer in the presence of tuberculous affection. Rakofsky and Kniekerboker (MC AUS) dealt with 69 cases of primary coccidioidomycosis of the lungs from desert areas. Parsonnet Kloss and Bernstein (Newark N.J.) dealt with pleural exudates in congestive heart failure.

1947 Scott and Lendrum (Glasgow) produced some striking pictures of pulmonary hemosiderosis. More good work on mass radiography was recorded.

NERVOUS SYSTEM

It is only of late years that it has been realised how much radiology can help in investigations on the central nervous system especially in the case of tumours.

1911 Hydrocephalus was studied by Leonard (Philadelphia). Kleinsberg mentioned that pus has been diagnosed in several cases. He had been able to see several calcified tumours.

1912 Pancoast (Philadelphia) located a psammoma.

1916 Mulvandre (London) proved that bullets move about in a lacerated cerebrum.

1917 Heuer and Dandy (Mayo Clinic) working with Bretjers and Waters gave some of their first results on localisation of brain tumours. G. L. Carr described the effects of intra and supra sellar tumours and devised a method for seeing the internal auditory meatus a common site for bilateral neuromas.

1918 Dandy (Mayo Clinic) made cranial history by his method of localising tumours involving the ventricular system by means of air replacement.

1919 Potter (Chicago) showed a case of hydropneurocranium and suggested that many brain cysts arose from small injuries.

1921 Sicard (Paris) made an outstanding advance by demonstrating the possibility of localising spinal tumours by means of lipiodol injections.

1923 Bertwistle (Leeds) devised a method of localising the area of brain beneath a trephining. This he improved in 1926.

1924 Jacobsen (Stockholm) injected lipiodol into cystic brain tumours to localise them. J. D. Camp (Mayo Clinic) investigated tumours involving the sella turcica. O. Sullivan enumerated the brain tumours which show a tendency to calcify. Pierson (U.S.A.) gave a good series of ventriculographies.

1925 By this time Dandy (Mayo Clinic) had done 500 ventriculographies with only three deaths. W. H. Stewart (New York) wrote an interesting paper on the Disappearance of Roentgenographic Evidence of Fractured Skull showing the absence of callus and the delayed union of these cases.

1931 Langle introduced encephalography. Air introduced into the spinal theca ascends and permits of visualisation of the ventricles and also of the contour of the brain.

Tyne) dealt with the development of bronchiectasis. Nessa and Rigler (University, Minn.) watched the X-ray manifestations of pulmonary oedema. Grumbner and Cutler (Chicago) depicted a case of air in the anterior mediastinum in a newborn, which was successfully dealt with by aspiration.

1942. Evans and Beech (University, Minn.) followed up an epidemic of acute pneumonia, taking many radiographs. Keiley (London) added enlargement of bronchial glands and benign infiltration of the lungs to the symptoms of erythema nodosum. Hendrick's work contains a good diagram of the points of attack of cancer in the lung. Farinas (Havana), by lining the mucous membrane of the upper respiratory tract by means of a nasopharyngeal spray, was able to produce some striking pictures of the larynx and trachea. Ellis, Smith, Bonebroke and Hunter (Wallace, Ida.) found respiratory troubles common, and predisposing to silicosis among miners. Adams (Chicago) published an exhaustive review of pneumonectomies and lobectomies for tuberculosis. Overholt (Boston) stressed the importance of lung cancer, the symptoms of which differed little from those of any other lung affection. Hartzell (Cleveland) worked on hæmothorax among healthy subjects.

1943. Harvey (Rochester) dealt with mediastinal effusions in children. Fetter (M.C., U.S.N.R.) went into the real and apparent increase in lung cancer. Robbins (Boston) dealt with fifteen cases of bronchogenic cysts; Stern (M.C., A.U.S.), stressing the frequency with which disease of the lungs is obscured by the heart shadow, recommended the oblique view. Kerley (London) demonstrated enlargement of the bronchial glands in erythema nodosum. Polgar and Lendvai (Budapest) studied Pancoast's syndrome, paradoxical breathing at apex.

1944. Hankins (M.C., A.U.S.) found a traumatic hernia in the pharynx of a trumpeter. Owen (Scott Field, Ill.), Neeldes and Gilbert (Hunter Field, Savannah, Ga.) and Huffard and Applebaum (Toledo) brought much information to light on pneumonitis, it is characterised by rapid development of opacities which disappear with similar rapidity. Adams and Bloch (Chicago) removed a mediastinal hæmangioma. Rees-Jones pictured cystic disease of an azygos lobe. Lloyd Rusby (London) showed excellent radiographs of mediastinal dermoids. Pneumonia, pneumothorax and emphysema were the findings of a case of kerosene poisoning, which symptoms gradually subsided (Scott, Louisville). Great attention was paid to mass radiography of chest by the R.A.F. and U.S. Navy.

1945. Jackson and Parker (Harvard) investigated pulmonary Hodgkin's disease. Friedlander (Western Reserve Univ.) made a study of the anterior mediastinum, a favorite site for dermoids and teratomas. Kerley (London) described sarcoid disease to be an indolent affection attacking almost any tissue in the body. Hennell and Sussman (New York) described the transient infiltrates of eosinophilia. Robbins and Hale (Boston) studied lobar and segmental collapse. Mass radiography was dealt with by Behrens, Hilleboe, Long and Yerushalmy (New York). Blair (London) wrote a valuable paper on chest manifestations in abdomino-thoracic injuries; they include tension pneumothorax, interpleural hæmorrhage, traumatic diaphragmatic hernia, blast and foreign bodies. Robbins and Hale (Boston) gave useful work on lobar and segmental collapse. Krause (M.C., A.U.S.) found lung infarcts to be commoner than generally supposed. Tillett, McCormack and Cambier (New York) treated twenty pneumococcal empyemata with penicillin, with only one failure. Schmidt (Denver) advocated pneumopentostomy in certain lung conditions to induce collapse. Katz and Reed (Washington, D.C.) dealt with mediastinal effusions. Hodges and Wood (M.C., A.U.S.) described eosinophilic lung, a tropical condition. Mathey-Cornat (Bordeaux) illustrated carcinoma of lung apex and larynx. Montano (Mexico) found that in 80 mediastinal tumours 60 were affections of the lymphatic system, which are usually radiosensitive, especially lymphosarcomata.

1946 McDonald and Ehrenpreis (MC AUS) pointed out that primary atypical pneumonia usually involving the base is either circumscribed when it is benign or disseminated when it is more serious. According to Soderman and Stuart (Tulane) lipiodol pneumonia is of increasing incidence. Overhold and Wilson (Boston) stressed the importance of distinguishing between quiescent and active tuberculosis and the value of serial radiographs in bronchial carcinoma for which Frimann Dahl (Oslo) found tomography invaluable. Iodge (Sheffield) wrote a masterly thesis on the lung markings which should be read by all interested in lung topography. Zwerling and Palmer (USPHS) studied lung calcification in relation to the histoplasmin and tuberculin tests. Cerstl Warring and Howlett (Hartford Conn) investigated lung cancer in the presence of tuberculous affection. Rakofsky and Knickerbocker (MC AUS) dealt with 60 cases of primary coccidioidomycosis of the lungs from desert areas. Parsonnet Kloss and Bernstein (Newark NJ) dealt with pleural exudates in congestive heart failure.

1947 Scott and Lendrum (Glasgow) produced some striking pictures of pulmonary hæmosiderosis. More good work on mass radiography was recorded.

NERVOUS SYSTEM

It is only of late years that it has been realised how much radiology can help in investigations on the central nervous system especially in the case of tumours.

1911 Hydrocephalus was studied by Leonard (Philadelphia). Klumberg mentioned that pus has been diagnosed in several cases. He had been able to see several calcified tumours.

1912 Pancoast (Philadelphia) located a psammoma.

1916 Viskandre (London) proved that bullets move about in a lacerated cerebrum.

1917 Heuer and Dandy (Mayo Clinic) working with Brætzers and Waters gave some of their first results on localisation of brain tumours. G. I. Carr described the effects of intra and supra sellar tumours and devised a method for seeing the internal auditory meatus a common site for bilateral neuromas.

1918 Dandy (Mayo Clinic) made cranial history by his method of localising tumours involving the ventricular system by means of air replacement.

1919 Potter (Chicago) showed a case of hydro-pneumo-cranium and suggested that many brain cysts arose from small injuries.

1921 Sicard (Paris) made an outstanding advance by demonstrating the possibility of localising spinal tumours by means of lipiodol injections.

1923 Bertwistle (Leeds) devised a method of localising the area of brain beneath a trephining. This he improved in 1926.

1924 Jacobsen (Stockholm) injected lipiodol into cystic brain tumours to localise them. J. D. Camp (Mayo Clinic) investigated tumours involving the sella turcica. O'Sullivan enumerated the brain tumours which show a tendency to calcify. Pierson (U.S.A.) gave a good series of ventriolographies.

1925 By this time Dandy (Mayo Clinic) had done 500 ventriolographies with only three deaths. W. H. Stewart (New York) wrote an interesting paper on the Disappearance of Roentgenographic Evidence of Fractured Skull showing the absence of callus and the delayed union of these cases.

1931 Laruelle introduced cencephalography. Air introduced into the spinal theca ascends and permits of visualisation of the ventricles and also of the contour of the brain.

1932 Moniz (Barcelona) introduced arterial encephalography, the principle underlying this method is the deviation and obscuration of the arteries in the neighbourhood of a tumour. By this time Moniz had done 300, at first he used sodium iodide, but soon changed over to Thorotrast. The opaque medium is introduced into the carotid artery and an immediate radiograph is prepared. Edling and Ingvar (Lund) obtained good results in spinal examination using a quarter the amount of lipiodol advocated by Sicard. Mayer (Vienna) studied the erosive action of brain tumours on the skull. Rawak (Frankfurt) advocated encephalography for many organic diseases of the brain. Loew-Beer (Germany) detailed the sites of physiological and pathological intracranial calcifications: calcium is never laid down in the skull as the result of increased intracranial pressure. He diagnosed three Erdheim tumours, calcification being a feature of this neoplasm, the size of the calcified deposit, however, is no index of the size of the tumour. Adson (Mayo Clinic), in an analysis of 217 tumours, by means of the clinical history, ophthalmoscope and X-rays, was able to locate 70 per cent correctly of the remaining 30 per cent, ventriculography would localise 25 per cent. He found encephalography of most service in focal epilepsy, arachnoiditis, post-traumatic lesions and brain atrophy; with these findings Eley and Vogt were in agreement. Pancoast (Philadelphia) classified sellar tumours as follows: (1) intrasellar, pituitary adenomas which either eroded the floor or the dorsum sellæ, (2) suprasellar, from the craniopharyngeal pouch and other mid-brain vestiges, (3) parasellar, from growths in the middle cranial fossa, and (4) metasellar, due directly or indirectly to dilatation of the third ventricle. Christie pointed out the value of radiology in showing the filling of the valleculæ, and also larynx, on attempts at swallowing in cases of chronic progressive bulbar palsy.

1933 Fraenkel and Koschewnikow (Stockholm) did encephalographies on 400 children. Cushing (Boston) reviewed twenty years' work on the pituitary.

1934 Dyke and Davidoff (New York), using 20 cc of air, produced some remarkable encephalographies, which revealed brain sulci, corpora quadrigemina and other landmarks.

1935 Dew (Sydney), who has done such sterling work on hydatid disease, published ventriculograms illustrating a primary cyst of the brain, such occurring exclusively in young children. Krabbe (Copenhagen) reported six cases of facial and meningeal angiomas associated with calcification of the brain cortex. Dyes (Wuerzburg) produced some striking pictures of the ventricles, whilst Prendergrass and Hodges (Philadelphia) demonstrated dilatations of the cavum septi pellucidum and cavum vergæ. Hamby and Gardner (Cleveland) worked on suprasellar tumours. Zimmer (Wuerzburg) showed some beautiful radiograms illustrating syringomyelia. Saito (Nagoya), using Thorotrast injections into the nerve sheaths, was able to demonstrate breaks in continuity. Schwartz (New York) estimated that 7 per cent of all cases of intracranial disease showed calcification. Ginsburg (Moscow) described six positions for examination of the skull for fracture. Moore (Washington University) worked on hyperostosis frontalis interna. Zeitlin (Cook County Hospital) dealt with three cases of pineal tumour. Lohr (Magdeburg) claimed that arteriograms gave not only the diagnosis and localisation of tumours but the type and extent of growth. Davidoff and Dyke (New York) discussed congenital tumours of the 3rd ventricle. Buey and Buchanan (Chicago) described a case of teratoma of the corda equina.

1936 Faiberov (Kharkov) studied bony changes round the foramen rotundum. Geshelekter (Baltimore) made a study of primary tumours of the cranial bones. Gaál (Budapest) investigated an aneurism of the internal carotid artery. Putman and Hampton (Boston) controlled injection of the Gasserian ganglion by X-rays.

1937 Lindblom (Stockholm) gave minute details of the vascular canals in the skull.

Roentgen (Wuerzburg) recounted four cranial arteriovenous aneurisms. Patten (Pennsylvania University) showed encephalograms of porencephaly. Sosin (Peter Bent Brigham Hospital) averred that radiology was as accurate as clinical methods in the localisation (50 per cent) and typing (25 per cent) of cerebral tumours. Mayer (Vienna) revealed erosions of the bone in the vicinity of the cerebro pontine angle. Kreim (Oslo) described Pringle's disease—a condition affecting the ectoderm—the skin and nervous tissue. Gral (Budapest) by carefully prepared radiographs was able to demonstrate certain bony causes of trigeminal neuralgia. Cloward (Chicago) depicted a spinal extradural cyst associated with kyphosis. Young and Scott (Temple University) found that air had advantages over lipiodol in the localisation of spinal tumours. Zehnder (Zurich) investigated subarachnoid cysts. Farberov (Kharkov) declared that 60 per cent of all cerebral tumours caused changes in the sella turcica recognisable by X rays.

1938 Robertson (Melbourne) gave the differential diagnosis on intracranial aneurisms and tumours. Kernohan (Mayo Clinic) considered radiology the only means of localising Rathke's cysts. Johnson and List (Michigan University) gave their results of ventriculography of tumours involving the aqueduct of Sylvius, pons and cerebello pontine angle and Landon (Adelaide) of those deforming the third ventricle.

1939 Schoen (Dresden) instanced a remarkable dermoid of the forehead involving the bone. Love Shelden and Kernohan (Mayo Clinic) considered radiology as the best means of diagnosing cysts of Rathke's cysts. Pardo (Buenos Aires) described a series of manifestations due to hydatid cysts in the skull. Penfield (Montreal) dealt with the adhesions which are a common cause of epilepsy, instancing a case. Cairns (Oxford) made an outstanding contribution in that excellent work *A Text Book of X ray Diagnosis*.

1940 Cantuero (Urbana) showed how calcification of the pineal gland present in 50 per cent of adults aids in the diagnosis of mid brain tumours. Snodgrass (Galveston Texas) found extradural hemorrhage the commonest finding in accidents—it is often associated with fracture crossing the middle meningeal artery—chronic subdural hemorrhage is next in order of frequency, intradural hemorrhage does not admit of X ray diagnosis. Nev (New York City) by allowing air to be drawn into the subdural space often found adhesions in cases of epilepsy. Campbell and Whitfield (Union University) described three cases of meningioma of the ventricles which were successfully dealt with.

1941 Nichols and Nosik (Cleveland) sought to minimise the dangers of Thorotrast by forced drainage. Peyton and Hill (Minn. University) found vitallium to be the ideal medium for closing skull defects.

1942 Kornblum and Bradshaw (New York) reported seven intrathoracic tumours of nervous origin—they were large, well defined and situated on the posterior wall of the chest.

1943 Rand and Reeves (Los Angeles) made a study of dermoids and epidermoids.

1944 Greenwood (Houston) illustrated six cases of aneurism of the circle of Willis, half of whom survived operation. Scott and Furdow (Seattle) found pantopaque of great service in work on intervertebral discs.

1945 Silbermann (Univ. Alabama) depicted ventriculograms of the fourth and fifth ventricles. Fichtelmaier and Campbell (Univ. Indiana) did the same the following year. Pantopaque was used by Arkuckle Shelden and Pudenz (Bethesda Md.) in studies of the protrusion of the intervertebral discs—the same subject was investigated by Schmitker and Booth (M.C.A.U.S.) who gave a lucid description of their technique.

1946 Tumours of the Sylvian aqueduct were studied by Wilson and Lutz (Yale). It is sad to record the death of Dandy whose last paper dealt with nine cases of arteriovenous aneurisms associated with hemianopsia. List Barge and Hodges (Michigan Univ.)

performed 127 cranial angiographies without serious sequelæ. Engeset (Oslo) found that displacement of the pineal gland was an important sign of brain injury, he advocated angiography for subdural hæmatomas when the expanding brain injury was giving place to œdema and shrinkage. Epstein and Davidoff (New York) praised the laminograph for tumours of the third and fourth ventricles, the Sylvian aqueduct and basilar cisterns. Lysholme (Stockholm) studied subtentorial tumours. Chiasmistitis was found to simulate tumour by Pendergrass and Perryman (Ill Univ). Friedl (Zurich) detailed causes of dilatation of the spinal canal. Peacher and Robertson (M C, A U S) determined the fate of lipiodol introduced into the cerebrospinal system. Porencephaly was studied by Pendergrass and Perryman (Univ Penn).

1947. Bayhn and Keiman (Duke Univ) recommended examination of the sphenoidal fissures in all intracranial and intraorbital diseases. Murphy and Arana (Univ Illinois) interested themselves in cerebellar atrophy. Baxter and Troland (New England) found dilatation of the ventricles frequently followed trauma.

VASCULAR SYSTEM

1897. The heart and great vessels were the subject of study from early days. It is reported that "an aneurism of the thoracic aorta at its union with the arch has been shown which other means of diagnosis failed to detect"—an outstanding success considering the apparatus available. Bécélère (Paris) and Barthemy diagnosed the exact form and seat of an aneurism confirmed at autopsy.

1900. Walsham (London) demonstrated that the swing of the heart with movement of the body is absent in pericardial effusion, he had seen many aneurisms by this time. Crane (U S A) stated that "simple inspection, palpation and auscultation open up a range of signs which X-rays cannot equal, but such is the supremacy of the eye, and such the importance of things seen, that the skiaseopic image comes as a revelation."

1902. Walsham (London) observed that the heart becomes more horizontal in cases of aneurism owing to "the superneumbent weight of the aneurismal sac."

1906. This year witnessed the winning over of Osler to the importance of radiology by Bactjer (Baltimore). The case was one of aneurism which had defied all clinical diagnosis. "Osler believes strongly in the use of this means of diagnosis." Kingscote watched a dilated heart slowly recover, clinically it was diagnosed as aneurism. Fryett found phleboliths in the sphenous veins.

1911. Groedel (Bad Nauheim) described changes in the heart shadow in disease. Sabat (Warsaw) gave us our first kymographs.

1912. Groedel (Nauheim) advanced the study of kymography, which was again taken up by Knox in 1925.

1919. G. E. Brown (U S A) showed the value of radiology in the diagnosis of early aortic disease of syphilitic origin. Ruggles (San Francisco) and Wakeley (London) described calcified angiomata.

1920. Klason (Stockholm) demonstrated calcified deposits in the endopericardium. Hodges (Richmond, Va) published interesting cases of pericarditis.

1923. Salmond (London) described pneumopericardium due to rupture of a cyst.

1924. Scholz (New York) recorded a case of calcification in the heart muscle.

1926. Holmes (Boston) made a study of thirty-four cases of aortic regurgitation.

1930. Brailsford investigated a case of pneumopyopericardium.

1931. Pearse and Warren (Rochester) prepared an illustrative series of arteriograms, including Raynaud's disease.

1932 Spronk found atheroma of the thoracic aorta commoner than generally supposed Barber and Orley (London) studied varicose veins by means of abrodil injections they found little sign of anastomosis between the superficial and deep veins of the leg in varicose veins the blood flowed peripherally and was influenced by posture rest and muscular exercise Popp (Galatz) watched the progress of a carcinoma of the auricular appendix Santos Lamas and Caldas (Lisbon) published work on arteriography Determann (Frankfurt) published a case of *cœur en cuirasse* the calcification appeared to have no effect on function Wood Prendergrass and Ostum (Philadelphia) reported six cases of dissecting aneurism of the aorta

1933 Allen and Cramp (Mayo Clinic) studied eighty five cases of arterial disease including Raynaud's disease by means of Thorotrast (arteriography) Kerley (London) described the X ray appearances of congenital heart disease

1934 Wosika and Sossmann (Boston) diagnosed calcification of the coronary arteries in a case of angina pectoris Freeman (Baltimore) saw the resolution of a pericardial effusion in myxoedema under the influence of thyroid extract Taylor studied concretion The Deans showed a heart's recovery from dilatation following the cure of an arteriovenous aneurism

1935 The Moscow School continued work on the kymograph Holst (Moscow) diagnosed a pulmonary aneurism and Warfield (Chicago) one of the innominate artery Keimbock and Weiss (Vienna) showed a case of inflammatory diverticulum of the pericardium and Comre (Philadelphia) a case of hemopericardium Kipp (Bisle) obtained some striking radiographs of calcified and ossified phleboliths of the saphenous vein Kræstle (Munich) demonstrated a bullet in the heart which had caused no symptoms for two years Muechi (Milan) investigated a case of the œsophagus passing in front of the aortic arch Udvardy (Debreceen) studied pulmonary sclerosis in relation to emphysema

1937 Roentgen kymography of the heart has made progress though it is essentially a specialist's task Cushing (Western Reserve Hospital) gave the differential diagnosis of pericardial diverticulum Rummert (Dusseldorf) instanced a case of calcified pericardium Freund (Iowa University) detailed a case of phlebectasia multiple calcified thrombi being detected Walker (Columbus Ga.) showed resolution of heart dilatation in cases of myxoedema arteriovenous aneurism and beri beri Albrecht (Frankfurt on Main) examined three cases of aneurism of the sinuses of Valsalva Veal and McFetridge (Louisiana University) prepared striking pictures using Thorotrast in intermittent claudication revealing obliteration of the main arteries Snellen and Nauta (Leiden) demonstrated coronary calcification in nearly forty cases Schwedel (New York City) studied the effect of abnormalities of the heart and aorta on the œsophagus Rego gave indications and contraindications for arteriography

1938 Clarborne and Holler (Atlanta Ga.) watched the bursting of a dissecting aneurism over a period of seven weeks Anderson (Stockholm) performed venography to diagnose axillary vein thrombosis Parkinson Bedford and Thomson (London) considered that aneurism of the heart was usually associated with thrombosis of the coronary artery leading to infarcts Veal (Washington D.C.) by venographs showed that œdema of the arms following radical operations for carcinoma was due to cicatrization around the veins not necessarily to recurrence

1939 Kerley dealt in masterly fashion with the heart in *A Text Book of X ray Diagnosis* Robb and Steinberg (New York) were able to get clearer radiographs of the heart and great vessels by the injection of diodrast into the basilar vein in the arm Ash Wolman and Bromer (Pennsylvania University) showed how a patent foramen ovale caused the heart

1933. The first book devoted to the subject of this section, *Radio Diagnosis*, by George W. Bailey of the University of Illinois. The first was published in New York by McGraw-Hill, and was largely a collection of papers.

1940. H. H. Pugh, *Physics of Cosmic Rays*, Holt. This book is a review of the subject of cosmic rays, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1941. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1942. *Theory of Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1943. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1944. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1945. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1946. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1947. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1948. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

1949. *Modern Physics*, by H. H. Pugh, Holt. This book is a review of the subject of modern physics, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject. It is a book of reference, and is a valuable source of information on the subject.

fat shadows mimicked tumour formation Tausing (Baltimore) recorded the findings of truncus arteriosus the picture was striking Neuluser (Harvard Univ.) studied double aortic arch

MUSCULAR SYSTEM

This system does not lend itself to radiology but several conditions are recognisable

1905 Robert Jones and Morgan (Liverpool) published a masterly account of myositis ossificans

1911 Pirie (Montreal) showed a case of myositis ossificans progressiva stone man

1915 Woodburn Morison (Ashton under Lyne) found that he was able to diagnose gas gangrene long before it was recognisable clinically the gas forming a radiolucent area round the embedded foreign body

1929 O Connor (New York) demonstrated calcified filaria in the intermuscular spaces in elephantiasis

1932 Stammel (U.S. Army) published a curious case of absorption of mercury by muscles following massage with a mercurial ointment

1933 Hein (Toledo Ohio) published a case of calcinosis universalis Barbacci (Geneva) described a case of cysticercosis in man

1935 Brooks (London) investigated a case of calcinosis and Schneider (Fulmer) a case of gas gangrene

1937 Wehlinger followed up a case of myositis ossificans progressiva Barsony and Winkler (Budapest) prepared beautiful plates showing the erector spinae Spangenberg Bastile and Gianni (Argentina) depicted a case of cysticercosis Gastay (Toulouse) demonstrated a calcified guinea worm in the scrotum and Beri (Guntur India) showed similar worms in the limbs Bertwistle (London) put forward the theory that wherever young especially vascular tissue came into contact with bone or a calcified deposit new bone would be formed The theory explains ectopic and periosteal bone (*Role of Chemiotaxis in Bone Growth*)

1939 Druckmann (Jerusalem) detected calcified filaria medinensis the largest of its kind in the posterior chest wall

1940 Bisgard (Nebraska University) pointed out the radiolucency of lipomas

1942 Fulton and Sosman (Harvard University) investigated angioma in muscles by injecting diodrast

1945 Howorth (New York) reviewed the literature of calcifications round the shoulder joint Waters (Baltimore) adding that such are remarkably amenable to X ray therapy Soule (M.C.A.U.S.) found myositis ossificans in 23 out of 64 paraplegics caused by injury or disease of the cauda equina

1946 Regan Biekel and Broders (Mayo Clinic) illustrated lipomas invading muscle

1947 Samuel (London) depicted a striking lipoma in the upper arm Good (Mayo Clinic) found enlargement of the thymus in 17 per cent of 100 consecutive cases of myasthenia gravis

DUCTLESS GLANDS

1906 Important observations were made on the possibility of revealing thyroid deformities by alterations in the tracheal streak—the radiolucent column caused by air in the trachea

1914 Rolleston and Boyd (London) observed calcification of the adrenals in Addison's disease

to become globular, projecting to the right of the sternum. Reindell (Freiberg) made a kymographic study of the heart of athletes. Ungerleider and Gubner (New York) made an advance in kymography by using teleroentgen pictures.

1940 Hubeny and Pollack (Cook County Hospital) found that erosion of the vertebrae, calcification and displacements were the characteristic signs in some fifty cases of abdominal aneurisms analysed. Moberg (Stockholm) found that the heart shadow varied greatly with different intra-pleural and intra-abdominal pressures. Sosman (Boston) considered fluoroscopy superior to the film in subclinical mitral disease.

1941. Master (New York) found fluoroscopy of greater value than films for the detection of coronary disease, basing his findings on the muscular behaviour. Taussig and Goldenberg (Boston) made valuable studies into the rheumatic heart. Hope Gosse (London) described a right aorta. Glasser and Lesser (New York) advocated ligation of the femoral vein for chronic, occlusive arterial disease, demonstrating the improved collateral circulation resulting. Pomeranz and Tunick (New York) injected angiomas with diodrast to outline their extent.

1942. Tracy (Middletown) instanced a case of calcified cardiac cyst and Patey (London) a coarcted aneurism of the scalp. Stabins (M C, U S N R) studied a case of primary thrombosis of the axillary vein, due to strain, using diodrast.

1943 Sosman (Peter Bent Brigham Hospital) showed how radiology could help in the diagnosis of six heart conditions amenable to treatment, three of them surgical: (1) The enlarged heart of Graves's disease, (2) that of patent ductus arteriosus, (3) excessive action of constrictive pericarditis in which the pulsation is diminished or absent. Among medical conditions comes beriberi, with its small pulsations, the enlarged flabby heart of acute nephritis and gummatous myocarditis. He pleaded for fluoroscopic examination for the "demonstration of the 'dancing' shadows of cardiac calcifications." Rigler and Hallock (Univ Minn) found cor pulmonale commoner than generally supposed, it is due to increased resistance in the lungs. Donovan, Neuhauser and Sosman (Boston) gave dilatation of the pulmonary artery, general enlargement, dilatation and engorgement of the pulmonary veins and hilar "dances" as being the signs of patent ductus arteriosus. Moberg (Stockholm) instanced calcification of the splenic and mesenteric veins.

1944 A patent ductus arteriosus associated with multiple pulmonary aneurisms and infective endocarditis was described by Holmes. Jones and Thompson (Los Angeles) dealt with an arteriovenous aneurism of the lung. Baker and Miller made further studies on venography.

1945 Nelson (Seattle) by injecting 80 per cent sodium iodide into the aorta was able to diagnose an adenocarcinoma of the kidney which had shown a normal pyelogram, also an abdominal aneurism, which had defied other methods. Bauer (Stockholm) illustrated cases of thrombosis by means of diodrast (the method is not above reproach as the media used may irritate the vein walls).

1946 Blakemore (New York) gave a good account of the value of angiography in the localisation of tumours of the cranium and arteriovenous aneurisms. Gilchrist (Edinburgh) gave an illuminating account of the brilliant surgery being done on ductus arteriosus and coarctation, and pleaded for its early recognition, when high hopes were justified. Robertson (New Zealand) watched an aneurism of the heart for thirty years, during which time it showed calcification. Walk (Vasteras, Sweden) studied calcifications in the heart valves. Hunter (London) made a study of the heart in anæmia.

1947 Merrill and Sosman and Dexter (Harvard Univ), Johnson, Wolin and Ross (Toronto), all did sterling work catheterising the heart through the cephalic vein, surely the most daring thing done to this organ. Helt (Univ Michigan) found epipericardial

fit shadows mimicked tumour formation Trausing (Baltimore) recorded the findings of truncus arteriosus the picture was striking Neuhauser (Harvard Univ) studied double aortic arch

MUSCULAR SYSTEM

This system does not lend itself to radiology but several conditions are recognisable

1905 Robert Jones and Morgan (Liverpool) published a masterly account of myositis ossificans

1911 Pirie (Montreal) showed a case of myositis ossificans progressiva "stone man"

1915 Woodburn Morison (Ashton under Lyne) found that he was able to diagnose gas gangrene long before it was recognisable clinically, the gas forming a radiolucent area round the embedded foreign body

1929 O Connor (New York) demonstrated calcified filaria in the intermuscular spaces in elephantiasis

1932 Strimmel (US Army) published a curious case of absorption of mercury by muscles following massage with a mercurial ointment

1933 Hein (Toledo Ohio) published a case of calcinosis universalis Barbaei (Geneva) described a case of cysticercosis in man

1935 Brooks (London) investigated a case of calcinosis and Schmerder (Fulmer) a case of gas gangrene

1937 Wehinger followed up a case of myositis ossificans progressiva Barsony and Winkler (Budapest) prepared beautiful plates showing the erector spinae Spangenberg Bastie and Gianni (Argentine) depicted a case of cysticercosis Gastay (Toulouse) demonstrated a calcified guinea worm in the scrotum and Beal (Guntur India) showed similar worms in the limbs Bertwistle (London) put forward the theory that wherever young especially vascular tissue came into contact with bone or a calcified deposit new bone would be formed The theory explains ectopic and periosteal bone (*Role of Chemotaxis in Bone Growth*)

1939 Druckmann (Jerusalem) detected calcified filaria medinensis the largest of its kind in the posterior chest wall

1940 Bisgard (Nebraska University) pointed out the radiolucency of lipomas

1942 Fulton and Sosman (Harvard University) investigated angioma in muscles by injecting diodrast

1945 Howorth (New York) reviewed the literature of calcifications round the shoulder joint Waters (Baltimore) adding that such are remarkably amenable to X ray therapy Soule (MC AUSA) found myositis ossificans in 23 out of 64 paraplegics caused by injury or disease of the crura equina

1946 Regan Bickel and Broders (Mayo Clinic) illustrated lipomas invading muscle

1947 Samuel (London) depicted a striking lipoma in the upper arm Cood (Mayo Clinic) found enlargement of the thymus in 17 per cent of 100 consecutive cases of myasthenia gravis

DUCTLESS GLANDS

1906 Important observations were made on the possibility of revealing thyroid deformities by alterations in the tracheal streak —the radiolucent column caused by air in the trachea

1914 Rolleston and Boyd (London) observed calcification of the adrenals in Addison's disease

1916 By this time the thymus had been successfully X-rayed; Crotti, in his *Thyroid and Thymus*, illustrated an example

1918. Lamson (Seattle) described intrathoracic goitre—and demonstrated how its rounded, movable lower margin distinguishes it from mediastinal tumour

1921 Carell was able to show the adrenals by injecting air into the perirenal fat

1923 Scholz (New York) diagnosed carcinoma of the tail of the pancreas by the gastric filling defect caused.

1932 Cramp, Ball and Greene (Rochester, Minn., Manhattan, Kansas, New York) noted calcareous deposits in the adrenals in twenty-three cases of Addison's disease Shands (Jackson, Miss.) demonstrated calcareous foci in the spleen in a case of tuberculosis

1933 Vastine studied the pineal gland

1934 Kadrnika and Babantz (Geneva) demonstrated the frequency and importance of splenic infarcts

1935 Brenner (Birmingham) watched the resolution of a heart in a case of myxoedema after thyroid administration

1936 Rubin (Brooklyn) studied a case of lingual thyroid and Cahill (New York City) five cases of adrenal enlargement Zuppinger (Zurich) showed a pharyngeal tonsil Lucherini (Rome) studied the lymphatic absorption of Thorotrast from the tonsils, finding that the thorium did not pass lower than the clavicular region

1937 Noble and Boig (Minnesota University) examined a case of generalised fibrocystic disease which cleared up on removal of a parathyroid tumour

1938 Bochner and Scarff (Columbia University) discovered a pineal teratoma Hickling (London) performed two successful splenectomies for tuberculous spleen

1939 Kinsella (Sidney) depicted a complete thyroglossal tract, diverticulum from this tract are responsible for the frequent failure of operation Baehman (New York) discussed splenic calcification

1940 Dickson, Liveley and Helwig (Kansas) discovered a thyroid tumour of the humerus without any primary growth of the thyroid

1942 Poer (Emory University) found myasthenia gravis to be associated with disease of the thymus

FEMALE GENERATIVE SYSTEM

1896 The possibility of seeing the foetus *in utero* was soon realised As early as February, Moore Madden had accomplished this

1909 Meijers (Amsterdam) pointed out the great medico-legal value of X-rays in determining "still" birth; the instant the child is born it fills its lungs and stomach with air, so becoming radiolucent

1912 McKendrick (Edinburgh) attempted pelvic perimetry by X-rays O'Donnell detected pregnancy at the fourth month McLean and Hickey used X-rays in the differential diagnosis of pregnancy

1913 Gilbert Scott (London) X-rayed a calcified fibroid of the uterus Laquerreure (Paris) found that pregnancy could constantly be detected at four and a half months

1914 Cary (Brooklyn) used collargol to determine the patency of Fallopian tubes in cases of sterility

1922 Homer (Chicago) acclaimed the advent of X-rays into obstetrics as a milestone on a par with forceps and chloroform

1923 Candy (Newport, Mon.) gave an excellent description of the foetus *in utero*.

1928 Rowden (Leeds) introduced his method of determining the relative size of head and pelvis to within one eighth of an inch—it has been used constantly since at Leeds.

1931 Leibow and Goldstein (Prague) gave indications and contraindications for the use of lipiodol in hysterosalpingographies the chief of the latter being suspected pregnancy. By serial radiographs they demonstrated peristalsis in the Fallopian tubes and discovered two cases of bicornute uterus and several approximating to it. In one case the uterus and vagina were double (this condition holds in the kangaroo (Frizer)) and in another a vestigial Müllerian duct filled with lipiodol. Patency of the tubes was readily made out. In fibroid tumours there was increased opacity and in carcinoma there was atony, loss of the triangular shape and irregular filling defects. They diagnosed a case of chorionepithelioma. Hypher (London) published an interesting series of intrauterine fetuses.

1932 Fray and Warren (Rochester) and Lockwood (Kansas City) worked on the X-ray features of carcinoma of the breast demonstrating its dense irregular shadow. Brakemann (Munich) noted 'tiling' of the skull bones (Spirding's sign) and a triangular head in cases of intrauterine death. Krauss (Munich) showed how hydranmios and anencephalos could be diagnosed with advantage to patient and obstetrician.

1934 Ude Weum and Urner (Minneapolis) diagnosed placenta previa using contrast media in the bladder. There have been many attempts to diagnose this condition by injecting lipiodol per os or even through the abdominal wall—such can only be dubbed more dangerous than is warranted.

1935 Lockwood (Kansas City) showed that the normal breast presents four layers: cutaneous, superficial fascia, glandular and a clear fatty space on the surface of the pectoral muscle. Cysts show as radiolucent spaces, benign tumours as rounded opacities, carcinomas as dense irregular opacities which may obliterate the clear space on the pectoral muscles. Affected glands may be identified. Caldwell, Moloy and Esopo (New York) studied the mechanism of labour under X-rays. Brakemann (Munich) discovered that in foetal death an upright radiograph revealed collapse of the vertebral column. Urner and Ude (Minneapolis) continued their work on the demonstration of placenta previa by observing the filling defect it caused in the bladder rendered opaque by sodium iodide—this was also done by Macdonald and Friedman (Montreal). Caldwell, Moloy and Esopo (Columbia University) discovered certain new features in the mechanism of labour. Solol (Oran) studied the accidents attending the introduction of contrast materials into the uterus.

1937 Cershon, Cohen and Coleher (Philadelphia) advocated radiographing breasts for early malignant disease and Hicken (Nebraska University) prepared mamographs by injecting the ducts with Thorotrast.

1939 Hartley (Manchester) dealt with signs of foetal death—besides Spirding's sign—which incidentally is present during labour—there is the failure of the foetus to grow and a sagging and rolling up of the foetus. Most curious results were obtained by Reifferscheid and Schmiemann (Wuerzburg) who by injecting opaque medium into the amniotic cavity just previous to Caesarean section were able to show that this medium filled the lungs as well as the alimentary tract. Hubeny and Delano (Cook County Hospital) pointed out the value of the lateral position in the late stages of pregnancy. Snow and Rosenohm (New York) showed excellent radiographs of the placenta. Walther (Zurich) studied embolism due to lipiodol entering the veins during examinations of the uterus with this medium. Roberts and Wilson (Liverpool) wrote an admirable account of X-rays in gynaecology; they showed that the symphysis pubis and sacro iliac joint widened in late pregnancy.

1940 De Costa (Michael Reese Hospital) showed that spontaneous pneumothorax was

not uncommon at birth and he was able to save one child by aspirating the air. Johnson and Sosman (Peter Bent Brigham Hospital) pleaded for the determination of age to be based on the bone age rather than on the size of the foetus. Evans and Bouslog (Denver) showed dilatation of the œsophagus in cases of intractable "heartburn" in pregnancy.

1941. Ball and Golden (New York) found displacement of the foetal head from the midline to be suggestive of placenta prævia.

1942. Lingley (Boston) considered psammoma calcification to be typical of papillary cystadenoma or adenocarcinoma.

1944. Roberts (Victoria, B.C.) found yet another sign of foetal death, viz. gas in the heart and vessels. Neuhauser (Boston) discovered three cases of meconial peritonitis it is characterised by the development of calcified plaques. Hartley (Manchester) produced a formidable array of obstetric and gynaecological conditions in which the radiologist was a help to the surgeon.

1945. Montgomery and Lang (Boston) found Viscorayopaque ideal for study of the uterus and tubes, its early disappearance being particularly satisfactory. Beachman (Tulane) preferred opaque injections to air in studying the tubes. Eisen and Goldstein (Toronto) encountered a case of lipiodol entering the lung during induction, opaque material being seen in the veins. Santiago (Bordeaux), after 1000 successful pneumoperitoneums, declared with truth that it was a safer method than puncturing the abdominal walls.

1946. Jarcho (New York) gave an exhaustive account of the congenital affections of the uterus as revealed by radiology. Maternal obstetric paralysis was worked on by Cole (New York). Bloomfield (London) studied the absorption of lipiodol into the uterine and ovarian veins.

1947. Rubin (New York), who had done much earlier work on the Fallopian tubes now published a monumental volume on Uterotubal Insufflation.

POST-MORTEM RADIOLOGY

Little has been accomplished in this field, though much could be done in the verification of the findings during life. Dr Rowden had an installation in the post-mortem room of the General Infirmary at Leeds, for some time. If X-ray apparatus were available, as it is in one or two dissecting rooms, much might be expected.

1931. Bowen (Denver) found that 400 cc. of fluid could be run into the pleural cavity before it could be recognised radiographically, thus explaining the number of effusions found post-mortem and missed during life.

1939. Snellen (Leyden) during the course of examinations noted calcification of the heart valves. Great increase in the anastomoses of the coronary arteries was noted when they were calcified. Arteriosclerosis was most marked in the abdominal aorta, whereas in syphilis the arch was most affected. In the living, calcification of the left coronary artery should be visible.

1941. Wiberg (Stockholm) studied the mechanism of patella dislocation.

1942. Zimmermann (Cap Girardieau) tried to imitate volvulus of the stomach finding a mobile spleen a factor.

1943. Schatzki and Hawes (Boston) studied the effects of artificial tumours on the œsophagus.

1946. Lachman (Univ. Oklahoma) studied the differences between the appearances and levels of the thoracic organs as shown by X-rays and those seen in the cadaver. Walk (Vaesteras, Sweden) determined the accuracy of calcified valves detected in life.

EXPERIMENTAL RADIOLOGY

This branch of radiology has received much less attention than it deserves. Some manufacturing chemists know of its possibilities in rickets in connection with vitamins. Little can be expected in Britain during this holocaust of war but it is to be hoped that a serious effort will be made on its conclusion.

1898 Cannon laid the foundation of study of the alimentary tract by his work on animals using bismuth in pill form as the opaque medium.

1929 Oka (Japan) discovered the possibility of visualising the liver and spleen by means of Thorotrast. This medium is not safe for humans but diodrast has been found to do the same service.

1932 Gardner and Henthote (Cairo) did experimental work on prosecta and on prosecta in the following year.

1935 Tamiya and Nosaki (Japan) using triple films were able to study peristalsis after the injection of ecdoidin, a substance causing tumour formation. Solotuehin (Leningrad) found that it was possible to determine the site of a fracture by fixation of thorium at the site.

1939 Kankkrenner (Berlin) showed that Thorotrast was capable of bringing muscles into view.

1939 Higgins (U.S.A.) prepared a map of the world showing the incidence of renal calculi bearing out Joly's view that they were associated with vitamin A deficiency. Of 299 rats fed on a vitamin A deficient diet 86 per cent developed calculi. Milheit (France) found that cardiospasm could be mimicked by section of the vagus in dogs. Ehrhardt (Graz) used triiodostearic acid in study of the placenta and concluded that it might be of service in humans.

1940 Shafiroff and Bierman (New York) found that crystalline opaque media were readily absorbed from the ligated gall bladder. Colloidal materials were not. Zuckerman (Oxford) did experimental work on blast injuries to lungs, finding hemorrhage common.

1941 Sender (University Illinois) showed that fat embolism occurred in the lungs apparent as a haziness when sterile oleic acid was injected. Barclay Barcroft Barron and Franklin (Oxford) made interesting studies in the fetal circulation in sheep.

1942 Rigdon (University Tennessee) studied the development of arthritis in rabbits following the injection of staphylococci. Following their studies on rabbits in which they induced embolism and subsequently localised it by means of diodrast. Liberson (New York) argued that it should be possible to do so in humans.

1943 Tribucco (Buenos Aires) worked on traumatic conditions of the rabbit's kidney.

1946 Schilling (Rochester) found that barium injected into the peritoneum of dogs becomes encapsulated, some found its way into the lymphatics.

OCCUPATIONAL INJURIES AND DISEASES

There are now an increasing number of injuries and diseases which are attributable to certain occupations for the diagnosis of which radiology plays a predominant role. It is more and more likely that litigation will ensue so that it would seem to be appropriate to enumerate some of these conditions. A special section in the Atlas has been started on this subject.

1904. Kassabian (Philadelphia) noted pathetically that "whereas X-ray dermatitis is now unknown to the patient, his own hands were affected five years ago and had not since recovered"

1907. Hall and Stover (Denver) gave a good account of fractures of the Bennet type sustained by baseball players "Marching fracture," a fracture of the metatarsal, occurring commonly among troops carrying heavy packs, was described

1922. Steurt (Johannesburg) gave a masterly account of "miner's phthisis"

1930 The famous conference on "Silicosis" was held in Johannesburg, the splendid films then shown are still being exhibited

1931. Sparks (London) gave the differential diagnosis of asbestosis and silicosis

1932 Bromley (London) described silicosis and Wood (London) and Ellman (London) gave an account of asbestosis.

1936 Brailsford (Birmingham) described cystic changes in the hands of pneumatic-drill workers.

1937. Beautiful examples of silicosis were prepared by Nau (Austin) and Koerth (San Antonio) Osmond (Pittsburg) tabulated the different forms of silicosis in factory workers McLaren described "dead-hand," a blanching and numbness experienced by pneumatic-drill workers.

1938 Pomeranz (U S A) added nickel from radio tubes to the long list of elements predisposing to tuberculosis

1939. Siltzbach (New York) instanced a case of silicosis in a dental mechanic due to the use of inferior pumice for grinding

1940. Silva, Chapedi and Pedace (Buenos Aires) described the mottled enamel found among eryolite workers, a mineral containing fluorine Wilkie (Sheffield) illustrated the sclerosis of bone in fluorine poisoning Stone (Boston) made a study of asbestosis Evans (Deepwater, N J) investigated the gases used in industry and their action on the lungs

1941. Bennet (Boston) dealt with shoulder and elbow injuries of professional baseball players.

1942. Campbell and Gloyne (London) instanced a case of pneumoconiosis due to inhaling Fuller's earth, it differed from silicosis and asbestosis Patton, Porro and Hobbs (New York) also found the same condition among tale workers Bell, Edison and Horonek (Labrador) studied the bone changes found among caisson workers. Siegal, Smith and Greenburg (New York) noted that large numbers of workers in tremolite tale factories had lung affections

1943. Aslett, Davies and Jenkins watched the development of coal-miner's pneumoconiosis Dunner (Hull) pointed out that whilst the effects of flue dust were known, those of scale dust in boilers were not Howard (Tarentum, Pa) stressed the importance of examining by X-rays all those entering a trade liable to silicosis

1944 Camiel and Berkan (Brooklyn) studied a case of nitric acid fumes poisoning, in those who recover, pulmonary resolution is rapid Mareh (Philadelphia) found a high incidence of leukæmia among radiologists

1946 Sutherland, Fawcett, Craw and Kemp (Sheffield) dealt with the modern aspects of industrial pulmonary disease McCarthy and Akenhead (M C , A U S) described byssinosis due to the inhalation of cotton particles Dunner, Hermon and Bagnall (London) found 11 out of 55 dockers dealing with grain and seeds showed X-ray appearances compatible with inhaled dust

1947 During the descent of a plane, infected material may be forced into the nasal sinuses, or hæmatomas may form, occluding the nasal sinuses

MEDICO LEGAL

Contrary to what one would imagine the Law took an interest in radiology almost at its inception as will be seen as follows —

1897 Obertz noted that coaptation of the ends of fractures was rarely attained but Braum denied that such was necessary for a good functional result. From this time onwards X rays featured in litigation. In America especially this gave rise to grave miscarriages of justice juries assessing damages on angulation instead of function.

1901 Girling Bird (London) wrote on the relationship of surgeon and radiologist from the legal viewpoint his remarks on the reading of radiographs by juries are well worth reading even now.

1905 Childs (Colorado) stated that "one of the greatest bugbears of the profession is the action for malpraxis in cases of fractures and dislocations and it is a duty that every surgeon owes to himself and to his patient that he should avail himself of the additional evidence which can be furnished by the skigram."

1931 Gilbert Scott (London) published *Radiology in relation to Medical Jurisprudence* a welcome work.

1932 Pirie (Montreal) dealt with the commoner pitfalls regarding fractures the commonest being congenital defects which may cause grave errors in judgment. Lange (Munich) stressed the need of radiographs taken immediately and those taken at the time of the action in all cases of spinal injury.

1936 Hirth (Toledo O.) an attorney declared that 'Silicosis is our greatest industrial hazard and that South Africa pays one fifth the cost of gold in compensation for this disease. He recommended that all applicants should be examined by X rays before being signed on. Some insurance companies insist on X ray examination before issuing large policies.

1936 Finklestein (Leningrad) found the os trigonum os tibiale and os peronei as the commonest accessory bones of the foot.

1945 An interesting case of mitral stenosis which might well have passed off as silicosis and become liable for compensation was cited by Ryder and Reincke (Univ. Cincinnati).

1946 Hadley (New York) discussed congenital deformities of the vertebral pedicles simulating fractures.

MILITARY RADIOLOGY

1940 One of the most striking features of this war is the frequency of fractured spine among airmen often unsuspected until days or even weeks later. The cramped position of many of the crew simulates that obtaining among coal miners in whom fractured spine is so common. It is essentially a flexion fracture sustained as a result of crash landings. Dearb Thomas and Allson (London) found many cases of blast were associated with the appearance of bronchopneumonia.

1941 Samuel pointed out that the metals of light density used for the modern bomb are radiolucent and therefore difficult to X ray. Glass particularly plate glass offers no difficulty in detection. Tobin Cohen and Vandover (N.C. A.U.S.) found injuries in 490 parachutists to number 23 per cent. 25 of the serious injuries were fractures none involving the spine. O'Reilly and Clovne (London) described the effects of blast on the lungs.

1942. Steel depicted lungs attacked with phosgene Hartley (Manchester) portrayed a good case of fatigue fracture of the tibia.

1943 Haynes (Clarksburgh, Va) devised a method of skeletal fixation of fractures which should find wide application in military surgery

1946 Thompson (M C , U S A) studied twenty cases of poisoning by carbon tetrachloride in a submarine. Richman and Baines (M C , A U S) found a traumatic unstable condition of the knee to be common among parachutists

HELMINTHOLOGY

Between 1939 and 1940 Barbieri (Padua) made an exhaustive X-ray study of ascariis, his illustrations were excellent

1943 Rocha (Bela Horizonte) obtained some striking pictures of ascariis in the duodenum

1944. Broeklehuist (London) demonstrated the guinea-worm with lipiodol during its life, after death it calcified, at times resembling an artery With the aid of the barium meal, Cole (Blossburg, Pa) strikingly depicted roundworms, 182 of which were passed after a dose of chenopodium

1945 Garland (M C , U S A), in an interesting account of tropical diseases, dealt with hookworm disease of the duodenum, filaria, causing chyluria and often calcified, distomiasis and eyeticereus, which frequently calcify Howorth (New York) stated that only one per cent of hydatids involve bone, the spina, tibia, femur and humerus being affected in that order Gaison (Atlanta, Ga) depicted a cyst of the liver, the commonest site Druckmann (New York) made serial radiographs of pulmonary hydatids In an investigation of 125 cases of hookworm Hodges and Keefe (M C , A U S) found evidence of the worm one month after exposure, the attack starts in the proximal jejunum, then spreading upwards and downwards

CONCLUSION

The purpose of this short history of Radiology is to show its progress Its shortcomings are fully admitted Previous to 1932 it was compiled from *The Archives of the Roentgen Ray*, since then from that wonderful book *The Year Book of Radiology*, edited by C A Waters and W B Firor, to the diagnostic section of which readers are referred for further knowledge and references This history is strictly clinical, technical details are scarcely mentioned The extraordinary number of simultaneous discoveries renders a true history almost impossible At least it will keep green the names of pioneers who have now gone to their last rest



Fig 3—HAND ORDINARY RADIOGRAPH

Note the complete absence of the skin outline in spite of the non-bulky nature of the part

Fig 4—HAND OVER-EXPOSED RADIOGRAPH SHOWING SKIN OUTLINE

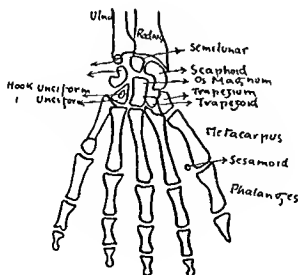
Observe that the skin is now seen, but at the expense of the bony definition. Even here it would be difficult to diagnose a condition merely on the surface contour

Fig 5—HAND SILHOUETTE RADIOGRAPH FIRST STAGE

The skin outline on the negative has been scratched on both sides with a needle and a print taken

Fig 6—HAND SILHOUETTE RADIOGRAPH, FINAL STAGE

The silhouette has been completed by filling in the background with Indian ink, making a more real picture. By an optical illusion the black background makes the bones appear to advantage



THE SILHOUETTE RADIOGRAPH AS AN AID TO CLINICAL DIAGNOSIS

Since the large majority of the bone plates are presented in the author's silhouette form it is advisable to describe its advantages.

"It is a striking fact that, whereas a radiographic negative clearly indicates the outline of the flesh, a print from such a negative fails in this particular. The result of this loss is that the print loses much of its value, it is something apart from clinical diagnosis, and gives no evidence of the points on which the clinical diagnosis was made.

"Some text-books seek to indicate soft parts by over-exposing the prints, but they do so at the expense of the bony definition. A radiograph is intended to show bones with the greatest possible distinctness.

"The silhouette radiograph¹ was evolved with the object of at once correlating the clinical findings with those of the Roentgen rays. The ordinary radiograph is largely a shadow photograph of bone; the silhouette radiograph is one of flesh and bone. The method is simple in the extreme. A negative is held up to the light, or placed in an illuminator, and the margin of the skin, which is always apparent, is scratched with a mounted needle on both sides. When the negative is printed the margin, thus outlined, shows as a black line. The background is now filled in with Indian ink, and the silhouette radiograph is complete.

"This method of printing enables one to form an idea of what the radiographic findings will be, when certain deformities are next met with. A silhouette radiograph of a dislocated shoulder reveals the loss of the deltoid fullness—the basis of Hamilton's ruler test—and increased axillary girth (Calloway's test). When such alterations in the shoulder are next encountered it will be easy to visualise an empty glenoid fossa, and the head of the humerus lying beneath the coracoid process. The bulbous finger tip and spindle fingers are suggestive of a periosteal whitlow and tuberculous dactylitis respectively. In an injury to the knee, loss of extension and a transverse depression over the site of the patella make a fracture of that bone highly probable. The loss of the gentle sweep of the shoulder points to a dislocated or fractured clavicle. On seeing a hand radially deviated, and displaced backwards in the 'dinner fork' position, it is easy to visualise that the underlying cause is an impacted

¹ "X-ray Prints A Suggestion" *Brit Jour. Surg.*, January 1923.

fracture of the radius, with backward displacement of its lower end. The 'wave deformity' of the forearm, with dorsal trough and ventral crest, can mean only a 'greenstick' fracture of radius and ulna.

"Thus the underlying cause of any swelling is readily ascertained. Where the swelling is due to bone disease it is intimately associated with that disease. Where, on the other hand, the bones are normal the cause must be sought elsewhere.

'The geography of sinuses injected with bismuth, or into which a probe has been passed, can be readily studied. Foreign bodies instead of appearing 'in spée' show their proper relations as regards depth and position.

"By means of the silhouette radiograph it is possible to confirm the impressions formed by palpation. In a dislocated elbow it is easy to see how the hard mass anteriorly and the loss of resistance posteriorly are caused.

"Muscular wasting is an important sign of bone tuberculosis. In the selecting of many plates considerable help was given by this feature. Malignant or rheumatic disease is not so accompanied, nor is osteomyelitis, in which condition irregularities due to sinuses are often seen. The adequacy, or otherwise, of the coverings of a stump is apparent. All this is lost in the simple radiograph.

'An important asset of the silhouette radiograph is the manner in which it shows the position of the limb at the time of the screening. In consequence of the risk of loss it is not always advisable to send negatives by post. I would suggest that if the skin outline were scratched on the negative before a print was made the practitioner would at once recognise its increased usefulness.

"The addition of the silhouette should aid diagnosis, in that it imparts a much needed reality to the radiograph."

Fig. 7.—DISLOCATION SHOULDER. (See Fig. 15)

Silhouette.—Note that without this process no trace of skin would be obvious; in places the deltoid and pectoral muscles are apparent. Note the flattening of the shoulder responsible for Hamilton's ruler test and the increased axillary girth (Calloway's test).

Radiograph.—The glenoid fossa is empty, the head of the humerus lies beneath the coracoid process, the great tuberosity has been evulsed.

Note.—Cases of dislocation complicated by fracture of the great tuberosity may prove most difficult of reduction, ranking next to those of the thumb.

Dr L A ROWDEN

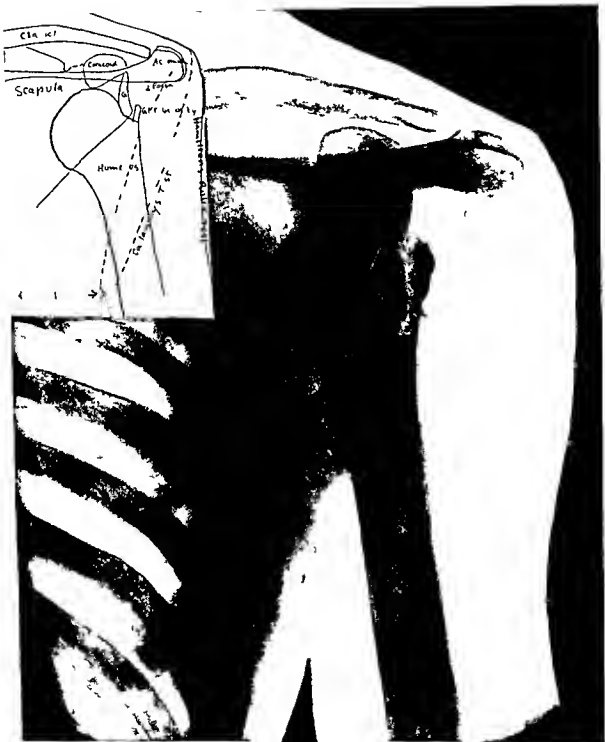


FIG 7



FIG 8



FIG. 9



FIG 10



FIG 11

Fig 8 —BULLET IN ANKLE ORDINARY RADIOGRAPH

Note the absence of flesh contour

Fig 9 —BULLET IN ANKLE OVER-EXPOSED RADIOGRAPH SHOWING SKIN

Note the loss of definition of the bones

Fig 10 —BULLET IN ANKLE SILHOUETTE RADIOGRAPH FIRST STAGE

The skin contour on the negative has been scratched

Fig 11 —BULLET IN ANKLE SILHOUETTE RADIOGRAPH FINAL STAGE

Note the position of the bullet in relation to the skin, and the irregularity of the skin over it. The scattered particles in front of the joint probably indicate the place of entry of the missile, which has therefore been rotated through 180°

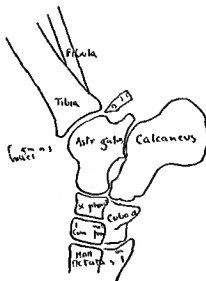




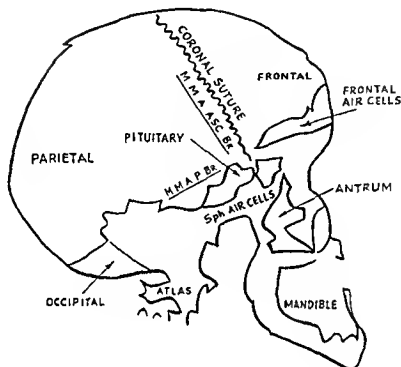
FIG 12



FIG 13

Fig 12 —SKULL LATERAL

Male, age 26



M M A = Middle Meningeal Artery

Fig 13 —NORMAL SKULL LATERAL

A male aged 63, who had had no serious illness

Note the coronal and lambdoid sutures separating the parietal from the frontal and occipital bones respectively. Immediately behind the coronal suture is a groove for the anterior branch of the middle meningeal artery and at right angles to this a groove for the posterior branch. From before backwards the floor of the skull is formed of the orbital plate of the frontal bone, the lesser wing of the sphenoid, the sella turcica and the dorsum sellae. Almost opposite the external is the internal occipital tuberosity marking the posterior level of the tentorium cerebelli. In front of the anterior cranial fossa are the frontal air cells, whilst in front of and below the sella turcica are the sphenoidal air cells. This is a true lateral radiograph as shown by the appearance of the sella turcica.



FIG. 14

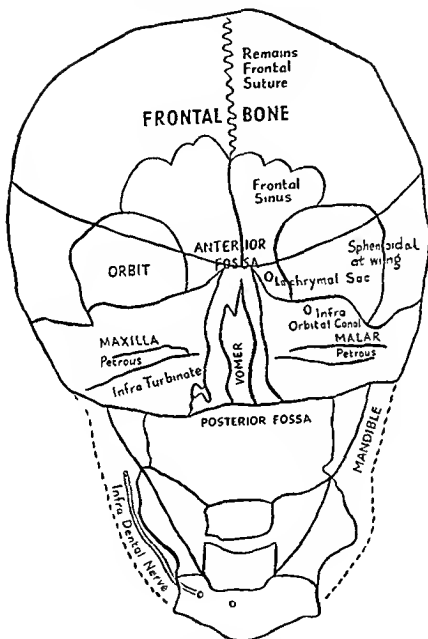


Fig 14—SKULL A P

From above downwards the following are recognisable the remains of the frontal suture and the large frontal sinuses, the orbits and crossing them a line which is continued to the lateral side of the skull—this is the floor of the anterior fossa. The vomer is seen vertically, its thickness being due to deviation. Crossing the orbit is the dark shadow of the petrous bone some distance below which is a similar line to above, marking the floor of the posterior fossa. The mastoid air cells are just visible in the region of the mandibular condyle. Unerupted third molars are visible



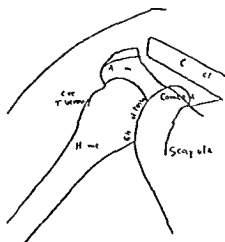


Fig 15—SHOULDER

Age 45—Note the poor architecture of the acromioclavicular and shoulder joints, the strength of each being dependent on structures outside the joints. The strength of the former is secured by the conoid and trapezoid ligaments. The shoulder is a most unstable structure, which accounts for its being the commonest joint in the body to be dislocated.



16



17



18



19

Fig 16

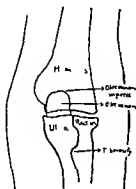


Fig 17

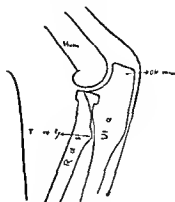


Fig 16—ELBOW (A P)

Age 27 —The three bones forming the articulation are well seen, the density of the olecranon is due to its superimposition on the humerus

Fig 17—ELBOW (LAT)

Age 21 —An almost perfect hinge joint of considerable strength

Fig 18



Fig 19

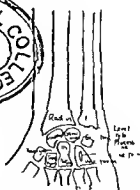


Fig 18—WRIST (LAT)

Age 24 —The most striking bone is the os magnum the semilunar is just visible, as is the hook of the unciform (*Lancet*, 6th October 1923 —A P B)

Fig 19—WRIST (A P)

All bones easily recognised



FIG 20



FIG 21



FIG 22



FIG 23

Fig 20

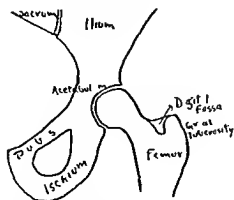


Fig 20—HIP

Age 20—A perfect ball and socket joint, it is only rarely that it becomes dislocated (Miners are, however, liable to this injury) The great and lesser trochanters are visible

Fig 21—ANKLE (LAT)

Note the beautiful way the bone is condensed along the lines of force From the summit of the astragalus these lines pass backwards in the os calcis and forwards, through the body of the astragalus, to the tarsal bones

Fig 22

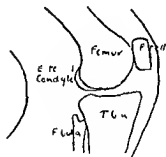


Fig 23

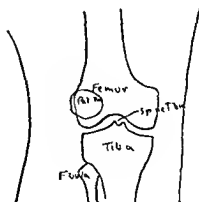


Fig 22—KNEE (LAT)

Female age 47—The femur is considerably denser than the tibia The tibia, fibula and femur with the patella floating on the latter, are seen

Fig 23—KNEE (AP)

Same case as Fig 22—Tibia and femur are seen with the patella almost entirely superimposed on the femur There is the same difference in density



FIG. 24



FIG. 25



FIG. 26

Fig 24

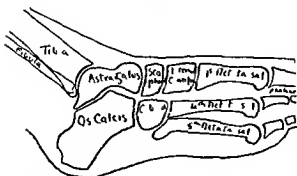


Fig 24—ANKLE AND FOOT (LAT)

The joints of the tarsus are well seen

Fig 25

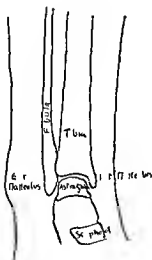


Fig 25—ANKLE (AP)

Female, aged 25 —Note the inverted U shape of the articulation, the slightest irregularity of this should arouse suspicion a lateral radiograph only too often shows serious injury

Fig 26

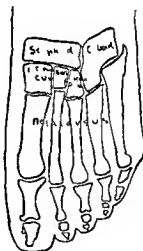


Fig 26—FOOT (AP)

A male aged 24 —Note the sesamoids related to the head of the hallux metatarsal, in the past they have been mistaken for foreign bodies



FIG 27



FIG 28



FIG 29



FIG 30



FIG 31

NORMAL SPINES

Fig 27—CERVICAL (A P)

Note the clearly defined intervertebral disc spaces. The spinous processes are recognisable as shadows superimposed on the vertebral discs. The transverse processes lie beyond the pedicles which are seen as dense oval shadows. The bodies grow flatter and wider as they are traced upwards and downwards from D 12.

Dr L. A. ROWDEN

Fig 28—CERVICAL (LAT)

The discs are apparent from the third downwards; the arch of the atlas is visible above with the stout process of the axis below. The pedicles appear as oval densities with radiolucent centres due to their being viewed end on. The spinous processes are well seen.

Fig 29—LUMBAR (A P)

A male aged 23.—The outlines of the bobbin shaped vertebrae are sharply cut. Here the spinous processes overlie the discs. The transverse processes are faint; the pedicles are seen as triangular opacities. The bodies are far stouter than any others and increase from above downwards to take the heavier weight to be carried. The outlines of the vertebrae are accentuated above and below by the presence of compact bone. On the right the 5th transverse process has fused with the sacrum, a common condition (sacralisation).

A. TOLLEY

Mr J. LEWIN

Fig 30—LUMBAR (LAT)

Same case as Fig. 29.—The normal lordotic curve is not so marked as usual. The bodies are clean cut. The spinous processes are just visible as triangular spikes. The ribs are visible.

A. TOLLEY

Mr J. LEWIN

Fig 31—AXIS



Seen through the open mouth, the axis is clearly recognisable with its odontoid process above. The articulation of the atlas with shoulder of the axis is well seen.

A. TOLLEY

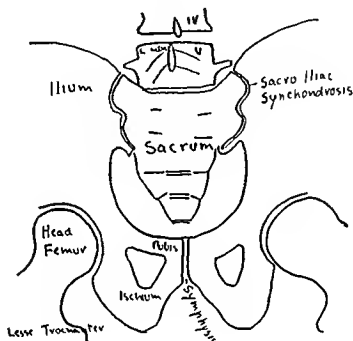
Mr J. LEWIN



FIG. 32

Fig 32—PELVIS

A male, aged 57—The sacrum, coccyx, ilium, ischium, pubis and hip joints are seen. The radiograph is not purely A P, since, on the right, the spine of the ischium is visible.



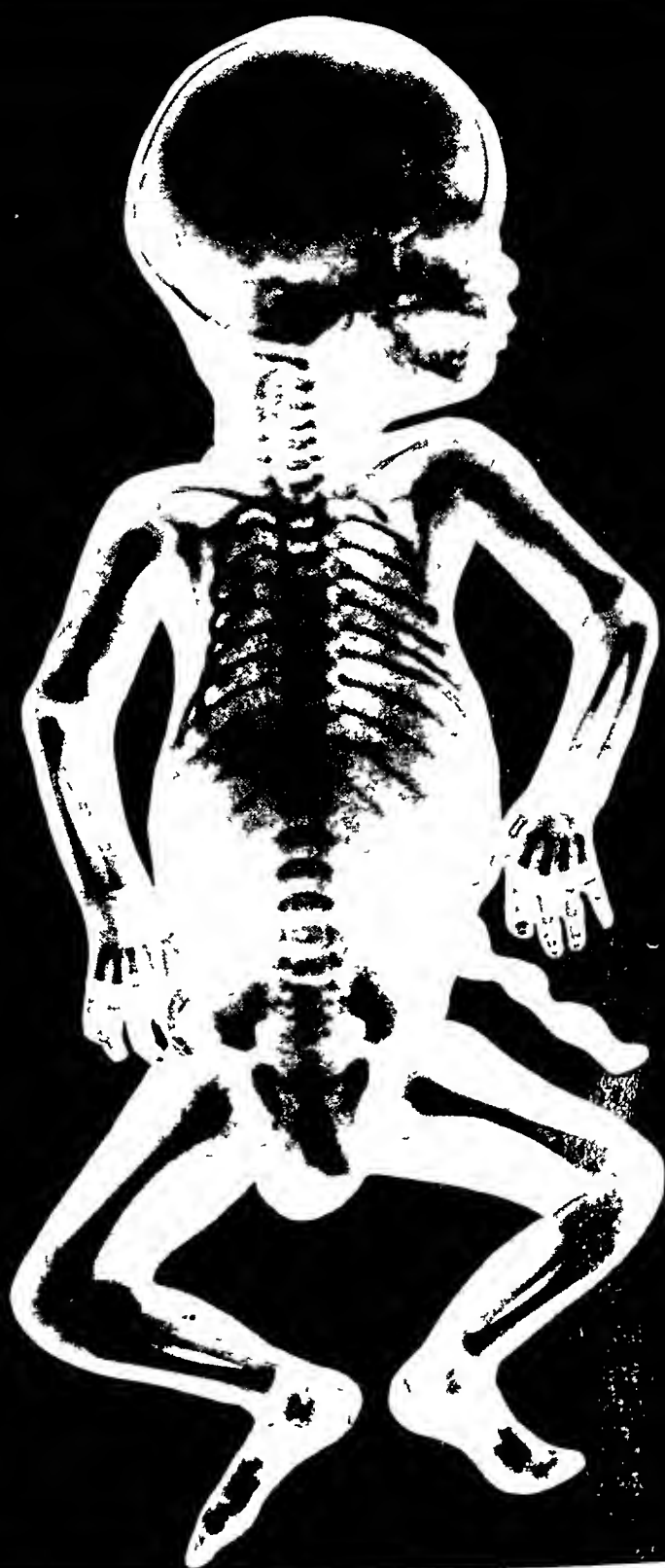


Fig 33 —FULL-TERM FŒTUS

A twin, male, weight 6 lb

The fulness of the lungs and stomach to "light up" is proof of still birth the first act of respiration causing air to distend both Full term is indicated by the presence of a centre of ossification in the lower femoral epiphysis on the right side

Head —The anterior fontanelle is just visible Frontal air cells are not present nor is the antrum, thus making the face look small A good line of teeth is visible within the upper jaw, other teeth are present in the mandible

Spine —The vertebral bodies are of almost the same size throughout The articular processes are well seen in the neck, whilst their equivalent in the sacrum are just commencing to ossify The os innominatum is well ossified in the region of the hip joint its density fading as it is traced away from the joint

Upper limb —The disproportion between upper and lower limbs is being corrected The joints are wide owing to the huge amount of radio-lucent cartilage The ends of the bones are at right angles to the shafts, since they represent lines of ossification and not joints The carpus has not started to ossify, the metacarpus is very dense, as are the terminal phalanges, on the left side

Lower limb —The head of the femur has yet to develop, whilst a centre of ossification has appeared at the distal end The astragalus calcaneus and metatarsals are partially ossified

DRS OXFORD and MITCHELL





FIG 34



FIG 35

FIG. 36

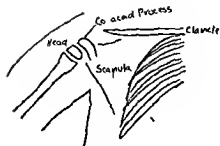


FIG 37



FIG 38

Fig 34



Age 12 months

Fig 34—SHOULDER

Fig 35



Fig 35—KNEE (LAT)

Radiograph shows the bone to be beautifully grained. The cortex is denser than the centre where the marrow is lodged. The contour of the diaphyses and epiphyses is sharply cut. The wide separation of femur and tibia is largely occupied by cartilage.

T. TORLEY

Mr J. O. HARRISON

Fig 36—KNEE (A.P.)

Age 15 months—The epiphyses of the femur and tibia have greatly increased in size. In density they compare favourably with the main shafts.

Fig 37



Fig 37—HIP

Age 15 months—The head of the femur is still formless as regards bone. A projection from the shaft marks the future site of the great trochanter.

Fig 38—HAND AND WRIST

Age two years—Carpal ossification is present only in the case of the os magnum and unciform. The metacarpal and proximal phalangeal epiphyses are well seen.



FIG. 39



FIG. 40



FIG. 41



FIG. 42

Fig 39

Normal girl aged 3

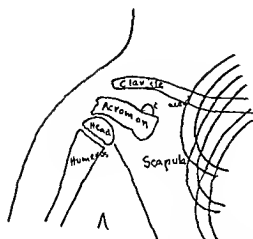


Fig 39—SHOULDER

Considerable progress has been made since the first radiograph (Fig 34). The epiphysis of the head has become well ossified.

Fig 40



Fig 40—HAND AND WRIST

Much of the carpus has begun to ossify. Epiphyseal plates are present for all phalanges.

Fig 41



Fig 41—ELBOW (LAT)

The humerus, radius and ulna are seen with the internal condyle apparently lying in the middle of the joint. In actual fact it lies internal to the joint.

Fig 42



Fig 42—ELBOW (A P)

The same delusion is present in this picture.



FIG. 43



FIG. 44



FIG 45



FIG. 46



FIG 47

Fig 43

Normal girl aged 3



Fig 44

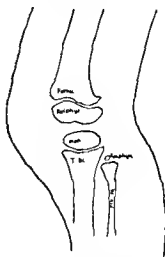


Fig 43—PELVIS

Considerable progress has occurred in the four years since Fig 37. The femur has taken shape the iliac ossification has joined up with that of the pubis a considerable amount of the ilium is ossified. The lateral part of the sacrum is somewhat chaotic.

Fig 44—KNEE (LAT)

Normal girl age 5—The epiphyses of the tibia and fibula are almost the width of the shafts they are deep and lenticular. Ossification has commenced in the fibular epiphysis.

Fig 45

Fig 46

Fig 47

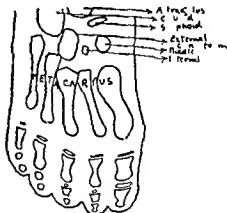
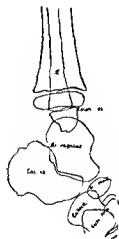


Fig 45—ANKLE (LAT)

The bones of the tarsus are taking shape the scaphoid the last tarsal bone to ossify is visible.

Fig 46—ANKLE (A P)

The tibial and fibular epiphyses are developing well.

Fig 47—FOOT (A P)

All tarsal bones visible are represented by round areas of bone. The proximal phalanges have epiphyseal plates but not the metatarsus.



FIG. 48



FIG 49



FIG. 50



FIG. 51



FIG. 52



FIG. 53



FIG. 54



FIG. 55



FIG. 56



FIG. 57

Normal boy, aged 9

Fig 53



Little change after four years

Fig 54

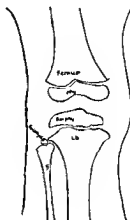


Fig 53—HIP

Fig 54—KNEE (LAT)

The epiphyses have taken on the shape of the ends of the adult bone The joint space and epiphyseal lines are now narrow

Fig 56



Fig 55—ANKLE (A P)

The tibial epiphysis is almost the width of the diaphysis it is not so deep as it was

Fig 56—ANKLE (LAT)

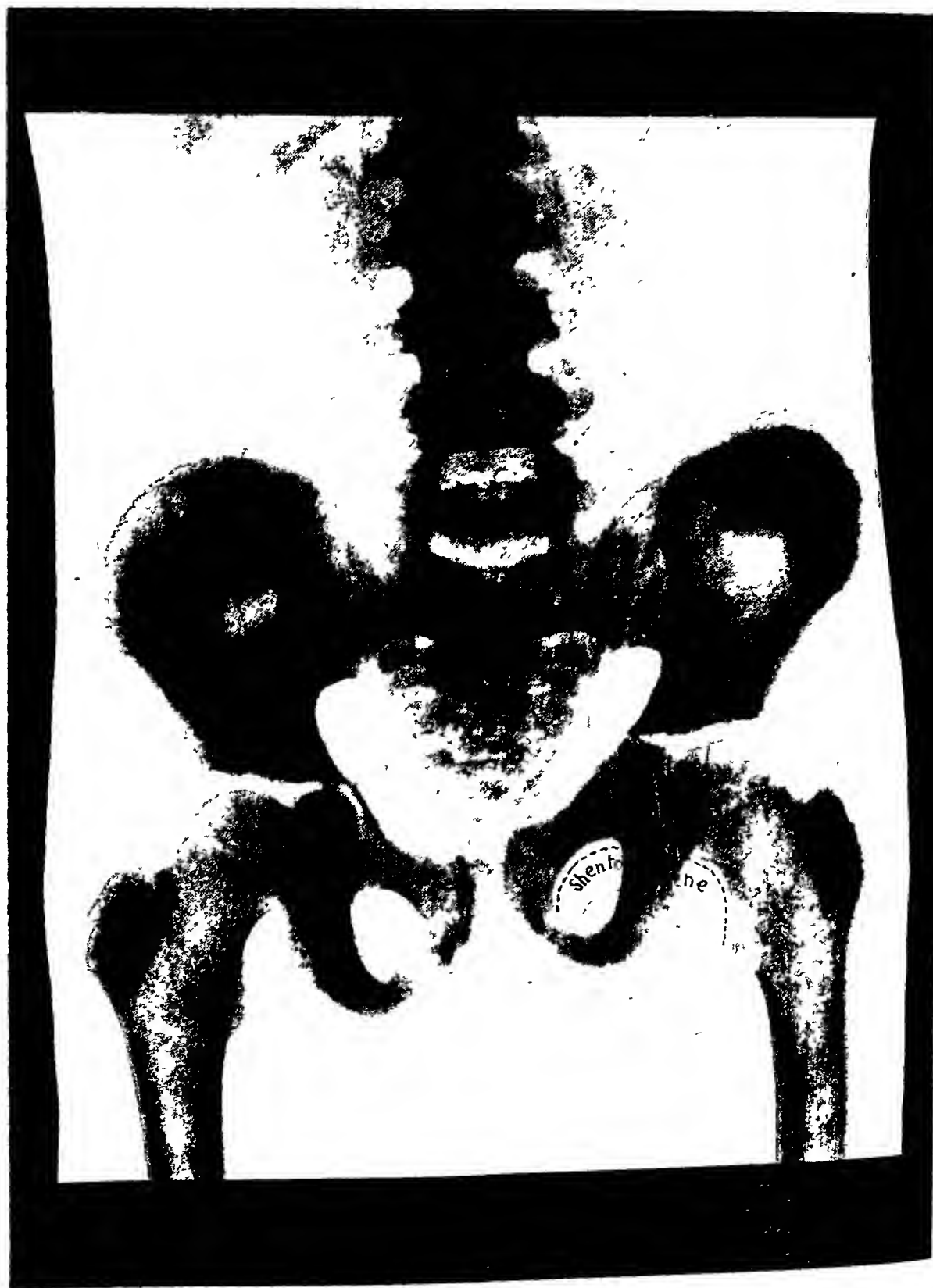
All bones are assuming their adult form

Fig 57



Fig 57—FOOT (A P)

As with the ankle the bones are nearing their adult shape



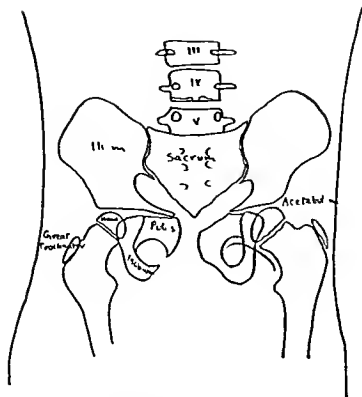


Fig 58—PELVIS AND HIP

Boy aged 12 —The acetabulum appears to be little changed from the condition present at 9 years (Fig 48) but considerable growth has taken place in the ilium, the descending ramus of the pubis and ascending of the ischium have not attained bony union. Considerable confusion is present in the lower lateral mass of the sacrum and in the coccyx.



FIG. 59

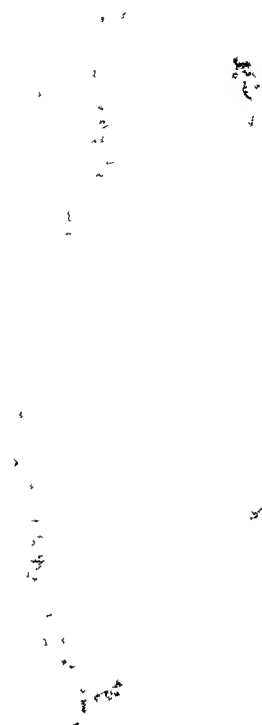


FIG 60

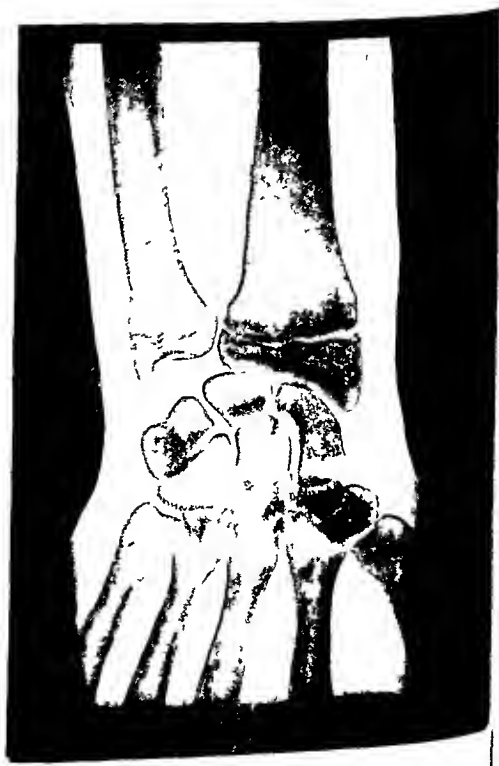


Fig 59

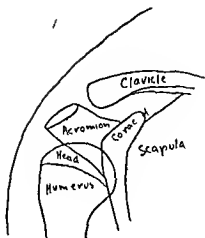


Fig 60



Fig 59—SHOULDER

Girl age 15 —The ephraim seal line of the head is disappearing

Fig 60—ELBOW (A P)

Boy, age 10.—The internal epicondyle has not united with the shaft of the radius and ulna are dense both features of an immature bone. The olecranon is seen through the humeral fossa.

Fig 61

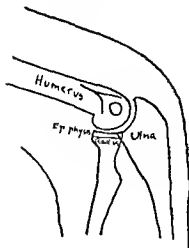


Fig 62

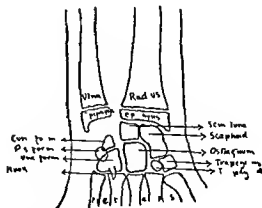


Fig 61 —ELBOW (LAT)

Youth, age 17.—A faint line separates the internal epicondyle from the rest of the humerus. A similar line separates the head from the rest of the radius.

Fig 62 —WRIST (A.P)

By age 12 Radial and ulnar epiphyseal lines are still quite distinct the carpal bones are assuming their adult shape.

63



64



65



66



Fig 63

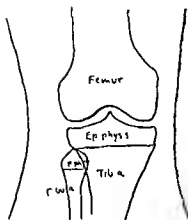


Fig 64

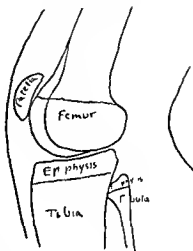


Fig 63—KNEE (A P)

Girl age 10—A very faint line separates the epiphysis from the femur whereas those of the tibia and fibula are quite clear

Fig 64—KNEE (LAT)

Boy age 17—The epiphyseal lines are more distinct than in previous case

Fig 65

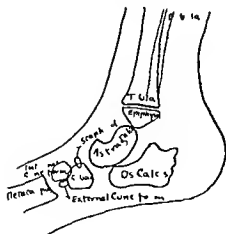


Fig 66

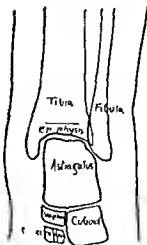


Fig 65—ANKLE (LAT)

Age 19—Note the os triquetrum the divorced tubercle of the astragalus which represents the os intermedium of the primitive foot. Its practical importance lies in mistaking it for a fracture

Fig 66—ANKLE (A P)

Age 11—The epiphyseal lines are first disappearing

63



64



65



66



Fig 63

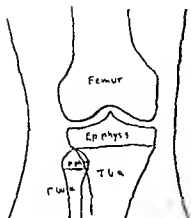


Fig 64

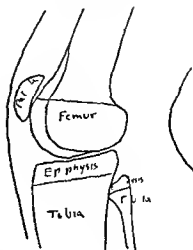


Fig 63—KNEE (AP)

Girl age 19 — A very faint line separates the epiphysis from the femur whereas those of the tibia and fibula are quite clear

Fig 64—KNEE (LAT)

Boy age 17 — The epiphyseal lines are more distinct than in previous case

Fig 65

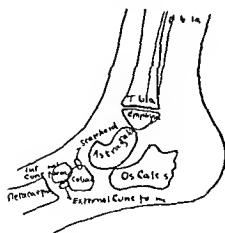


Fig 66

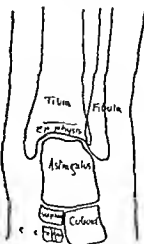


Fig 65—ANKLE (LAT)

Note the os triculum the divorced tubercle of the astragalus which represents the os intermedium of the primitive foot. Its practical importance lies in mistaking it for a fracture

Fig 66—ANKLE (AP)

The epiphyseal lines are fast disappearing

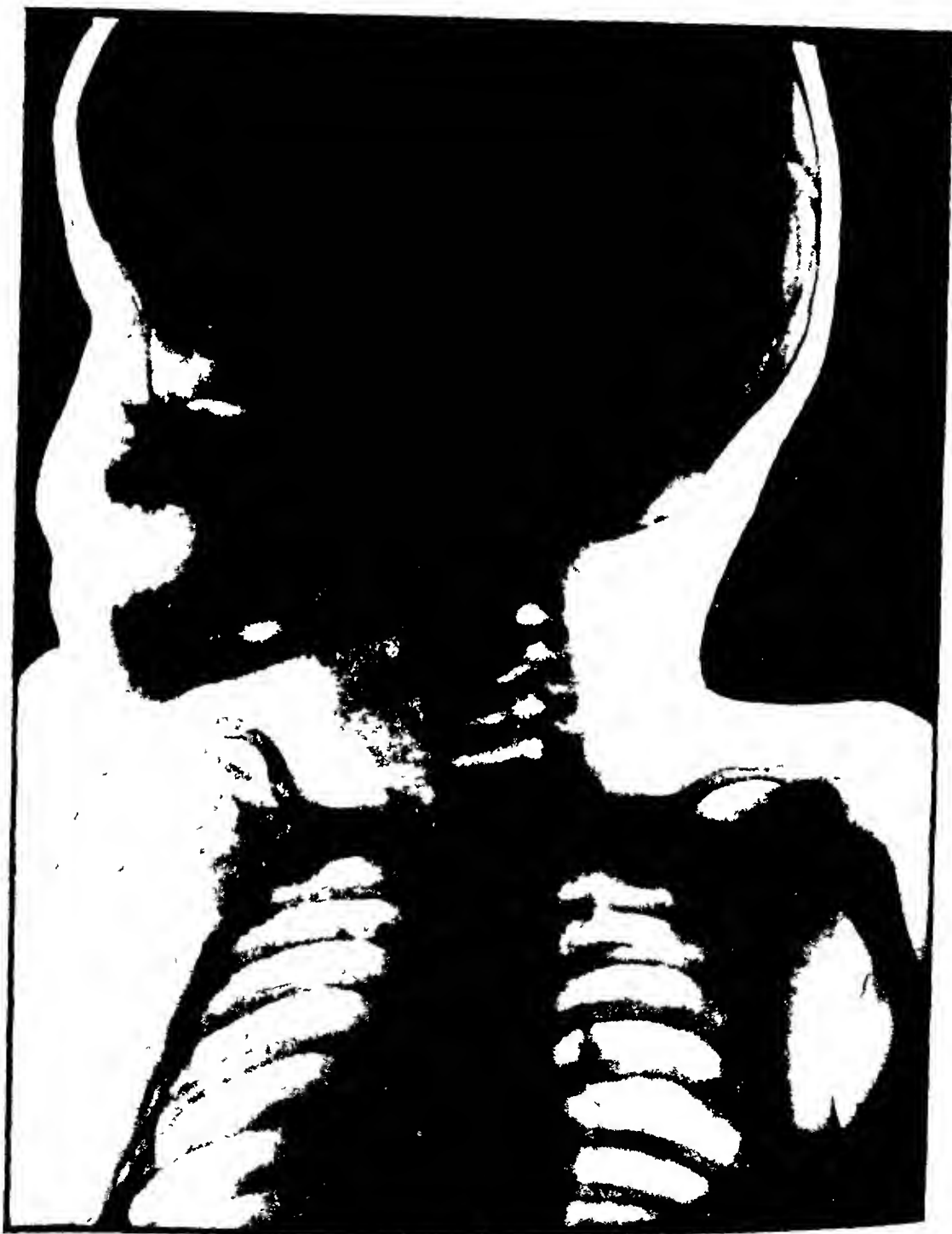


FIG. 67

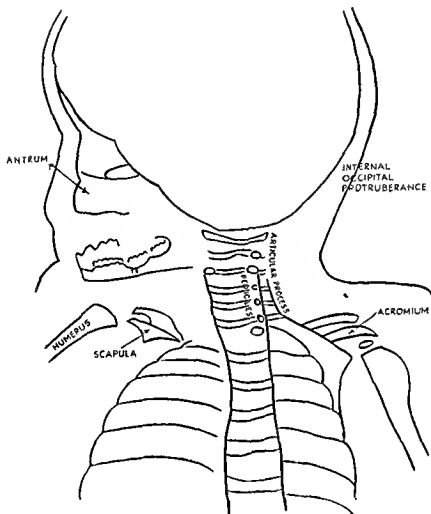


Fig 67—SKULL, CERVICAL AND DORSAL VERTEBRÆ SHOULDERS

A child of 8—*Skull*—No trace of any frontal air sinuses is visible though the antrum is being pneumatised. Several unerupted teeth are apparent in the mandible.

Spine—The atlas and axis can be recognised. The pedicles appear dense, with lighter centres, this appearance being due to their being seen end on. The articular processes are well seen, even spaces separate the bodies.

Shoulder—The epiphysis of the humerus is ossifying. The blade of the scapula is becoming denser. The clavicle is dense.



FIG 68

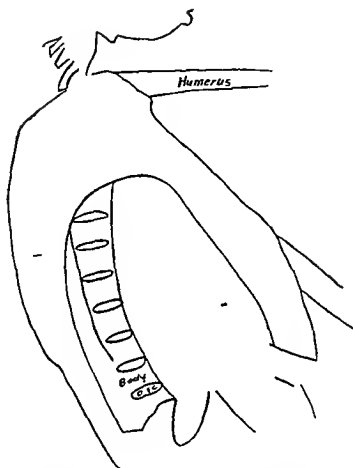


Fig 68 —SPINE DORSAL (OBLIQUE LATERAL)

Gul aged 18 —All the vertebral bodies and discs are uniform in size and density. A layer of compact bone is present in the upper and lower edges of the vertebral bodies.

Late 1 H. FRIER

Mr J. O. HARRISON

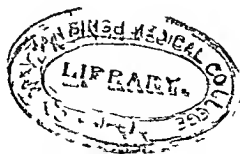


Fig. 69.—PROTRUSIO ACETABULI. (See Fig 20)

Clinical History.—A woman, aged 37; was treated when 14 years old as an early hip-joint disease. On present examination there was bilateral limitation of abduction.

Radiograph.—On both sides the acetabulum encroaches on the brim of the true pelvis.

N.B.—There is much doubt as to the nature of this condition. It is developmental rather than congenital in origin and suggests Perthe's disease of the acetabulum.

Nottingham General Hospital

Figs. 70 and 71.—CLEIDO-CRANIAL DYSOSTOSIS. (See Fig 67)

Fig. 70.—Clavicles. The outer halves of both are absent, whilst the inner halves show very defective ossification. The head of the humerus presents fragmentation similar to that found in Perthe's disease.

The right side of the heart is very much enlarged, due undoubtedly to congenital abnormality—*e.g.* patent ductus arteriosus.

Fig. 71.—Skull (A.P.). Presents a patent anterior fontanelle, whilst the frontal bone shows a faint mosaic of light and dark patches. A well-defined ridge marks the union of the two halves of the frontal bone.

The teeth are grossly irregular and the frontal and maxillary sinuses are infantile in character.

Nottingham General Hospital.

Fig. 72.—FEMORAL EPIPHYSITIS (See Fig 58)

Radiograph.—The necks of the femora have collapsed owing to weight subtending on bone, softened by aseptic inflammation, less than a right angle—*i.e.* coxa vara. The condition is in some ways akin to Perthe's disease. The ischium and ilium show rarefaction. The pubic bone is absent.

Figs 70–72 represent extraordinary findings in a boy aged 13, in addition he had a branchial sinus.

Nottingham General Hospital.



FIG 69



FIG 70



FIG 71



FIG 72

Fig. 73.—METATARSUS PRIMUS VARUS. (See Fig 57)

Radiograph—A wide space separates the hallux from the second toe. According to some authorities this predisposes to flat foot and to "march" fracture.

N B—The condition holds with monkeys but tends to disappear in the higher apes.

MR COUPLAND.

Fig. 74.—HAND. (See Fig 41)

A child about one year old.

Radiograph—There are only three metacarpals, one, very massive, representing three, articulates with an abnormally small thumb and with the index. The little finger is "floating," having no proper joint with the metacarpal, its phalanges are diminutive.

Fig 75.—ACCESSORY THUMB. (See Fig 40)

The child, aged six weeks, was brought for removal of an extra thumb.

Radiograph—A "floating" digit is seen projecting from the base of the thumb, its ungual phalanx is diminutive.

Operation—The additional thumb was found to articulate with the 1st metacarpal.

N B—Superstition endows the possessor of such to be lucky, removal brings bad luck.

Late MR BRAITHWAITE.

Fig. 76.—HAND. (See Fig 40)

Radiograph—The forearm and hand are represented by a blunt appendage presenting three slight prominences. The forearm is the same length as the hand. The radius is represented at the elbow by a small piece of decalcified bone. There are two metacarpals, one massive, but short, two first phalanges, two second, one of which articulates with three terminal phalanges, it is almost at right angles to the other bones.

Figs. 77 and 78.—HAND: CONGENITAL (See Fig 6)

Clinical History—This woman is employed as a cook, and she carries out her duties without difficulty, she can hold a pencil between the index and middle fingers of the left hand and can write and sew. The right thumb cannot be moved actively. There is no evidence of a hereditary trait.

Radiograph—Fig 77 (left)—The first digit is triphalangeal and must be regarded as a displaced thumb or a duplication of the index finger, the thumb being absent.

Fig 78 (right)—The thumb is "floating"—i.e. only connected with the rest of the hand by soft tissues. It consists of three pieces of bone, the proximal piece being either representative of a phalanx or as part of a first metacarpal.

Both wrists show absence of trapezium and distal part of the scaphoid. The trapezium has fused with the capitate and on the left side it articulates with the first two metacarpals. The pisiform is unduly proximal. The radial styloid process has not developed and the radius is indented by the scaphoid, proximal to which is some rarefaction.

DR R. O. RAHUL

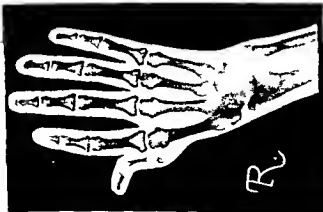
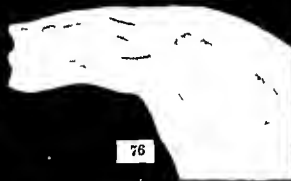


Fig. 79.—INTRA-UTERINE AMPUTATION: HAND. (See Fig 6)

Clinical History —The condition occurred in the left side of a middle-aged man. There was no deformity whatever in his grandparents, parents, two brothers, or sister. He was a keen cricketer, using his deformed member to steady the bat, he played hockey with success, changed the gear lever of his car with the stump, swimming was somewhat awkward as he tended to go in circles. He used the deformed member with consummate skill to tie his bootlaces and tie. In turning over the leaves of a book he would press the book on to the stump with the sound hand. There was no trace of tenderness such as is present with other amputations. Examination revealed the left forearm to be $1\frac{1}{2}$ inches shorter than the right and the same amount in circumference. The skin over the lower part of the forearm was flabby, red and unhealthy-looking, and the seat of chilblains in the winter. There was now no trace of a scar but in his young days there had been. The movements at the elbow were very free, hyperextension was in evidence. Contrast the function of this stump with that of one caused by accident or war wound.

Radiograph —Little change is apparent in the first row of carpal bones, but only one of the second row is visible, no trace of metacarpus is visible. The upper radio-ulnar joint is subluxated.¹

Dr H. L. GROOM

Mr A. P. BERTWISTLE

Fig. 80.—WEBBED FINGERS. (See Fig. 40)

Radiograph —All the fingers are webbed, the third and fourth metacarpals are dwarfed, the middle phalanges are absent in the index and little fingers.

Remarks —The interest in this radiograph, in that it was taken some time before 1900 is its clarity. At that time long exposures were usual.

Dr HATCH

Figs. 81 and 82.—SPINA BIFIDA

Clinically —The girl, aged 12, was unable to walk, clutching hold of anything within reach to aid her.

Radiographs —Fig. 81 (A.P.) —The second and third lumbar vertebrae are hopelessly deformed, no differentiation of discs and bone is apparent.

Fig. 82 (Lateral) —The second and third vertebrae have collapsed backwards, allowing the first almost to touch the third.

Treatment —Intensive education of the muscles by walking and raising the inner border of the sole greatly improved the patient's gait. Both legs responded to faradism. Three months later the girl could walk half a mile and a year later was walking with freedom.

Royal National Orthopaedic Hospital

Late Mr J. B. BARNETT

¹ *Lancet*, 25th November 1939, p. 1120



FIG 79



FIG 80

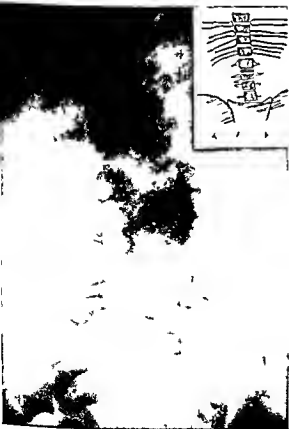


FIG 81



FIG 82

Fig. 83.—CONGENITAL ELEVATION OF THE SHOULDER (SPRENGEL'S).
(See Fig 67)

Silhouette.—Note the elevation of the right shoulder.

Radiograph.—The scapula and clavicle are clearly seen instead of being obstructed by the chest. An adventitious elongated bony mass is seen related to the inner border of the scapula.

Operation—This bone was found lying in the rhomboid muscle; it was excised and the trapezius and rhomboid muscles cut freely, with an excellent result.

Late Mr Daw.

Fig 84.—CONGENITAL ABSENCE OF THE RADIUS (See Figs 17 and 18)

Clinical History.—This condition was encountered in a man of 18. who was otherwise normal and whose family history was good. Movements at the elbow were limited; he gripped by flexing his wrist and fingers, particularly the first, on to the arm. The hand articulated with the ulna by means of a false joint on its outer border. Movement at this joint was very free; in supination the wrist moved dorsally over the ulna. full supination was possible, with help. The humerus on this side was an inch shorter than its opposite member. Muscular power was very much decreased. The hand was usually held pronated.

Radiograph—There is no trace of a radius: the ulna is bent. The carpus, of which the scaphoid and trapezoid bones are missing, articulates with the side of the ulna. No trace of the thumb is seen. Syndactylism is present in the case of the second and third fingers. Many of the interphalangeal joints show degenerative changes.

A P B B M J 24th February 1923



Fig. 85.—CERVICAL RIB AND PROCESS. (See Fig 27)

Radiograph.—This is unusual in that a rib occurs on the right side and a process on the left, which lack of symmetry is remarkable. A normal-shaped rib occurs on the right side, articulating with the seventh cervical vertebra. A stout triangular cervical process is seen on the left, its shape excludes the possibility of its being post-operative.

Fig. 86.—CERVICAL PROCESSES AND BAND. (See Fig 27)

Radiograph.—Two massive transverse processes project from the 7th vertebra.

N B.—In connection with such processes a band is often found stretching to the sternum, which causes symptoms almost identical to a cervical rib. The lowest cord of the brachial plexus bears down on it, causing pain down the inner side of the forearm and hand, and wasting of the hypothenar eminence. Occasionally the subclavian artery is compressed, resulting in trophic changes and even gangrene.

Symptoms usually appear in those who have to carry heavy weights. It is not uncommon among females at the menopause, who do heavy lifting—in these, loss of muscle tone is a factor (Walshe)

Late Mr DOBSON

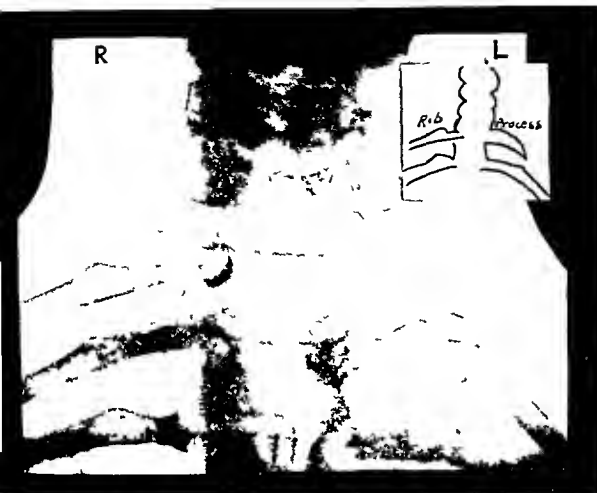


FIG 85



Fig. 87.—FISSURED FRACTURE OF VAULT OF SKULL. (See Fig 14)

Radiograph—An almost horizontal fracture of the cranial vault with considerable separation on the right, fading away almost to the size of a meningeal vessel on the left.

Nottingham General Hospital

Fig. 88 —FISSURED FRACTURE OF OCCIPITAL BONE (See Fig 13)

Radiograph.—A Y-shaped fracture of the occipital bone, the stem of the Y almost reaching the petrous bone.

Nottingham General Hospital

Fig. 89 —FRACTURED SKULL. (See Fig 13)

Clinical History.—A man, aged 31, was thrown over his bicycle handlebars, he was admitted suffering from concussion. A fractured base was evidenced by bleeding from the left ear and nose. He slowly became conscious, but was drowsy on admission to hospital.

Radiograph.—Extending from the superior angle of the orbit is a fissure which extends backwards to the occipital bone.

Late F H FRIER

Mr J O HARRISON

Fig. 90.—FRACTURED SKULL. (See Fig 13)

Clinical History—This girl, aged 14, was knocked off her bicycle by an omnibus. She was unconscious and, later, semi-conscious, for three days. Lumbar puncture four days after injury showed tremendous pressure which returned to normal on the eighth day.

Radiograph.—Just posterior to the parieto-occipital suture is a well-defined fissured fracture.

Late F H FRIER

Mr J O HARRISON

N B.—According to Sir Hugh Canns, 85 per cent of all motor-cycle injuries involve the skull or brain, and could be avoided by wearing a crash helmet such as is worn by members of H M Forces.

Fractures of the skull may be mimicked by sutures or grooves of meningeal vessels.



FIG 87

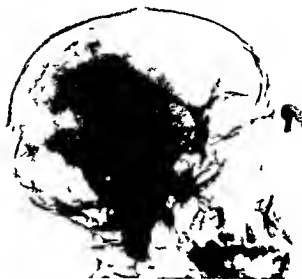


FIG 89

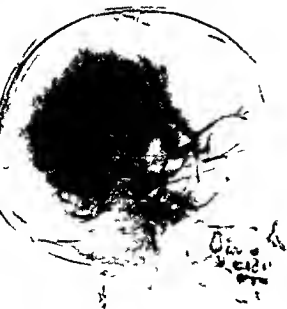


FIG 88



FIG 90

Fig. 91 —FRACTURE: FOURTH LUMBAR VERTEBRA

Radiograph —The outline of the fourth vertebra is irregular, especially on the left side. The depth is diminished compared with the vertebra higher up. The transverse process on the left side shows fragmentation close to the body, evidence of an old injury.

Nottingham General Hospital

Fig. 92.—FRACTURE: SPINE

Clinical History.—The man, aged 23, fell from some machinery, sustaining back and head injuries: the latter prevented treatment of the spine for a week, when it was extended and put in plaster. Consolidation was watched under X-rays.

Radiograph (15 months after accident).—The fifth lumbar vertebra has been the seat of a "crush fracture" which has obliterated the internal markings of the body. The inter-vertebral disc has almost disappeared, suggesting ultimate fusion of the fourth and fifth bodies

Late F. H. FRIER

Mr J O HARRISON

Fig. 93.—FRACTURE-DISLOCATION OF SPINE

Radiograph.—There is a fracture-dislocation of the dorso-lumbar spine and some lateral deviation of the spine at and below the site of the injury. The first lumbar vertebra, whilst retaining its connection with the second, has parted from the twelfth dorsal. There is a slight subluxation of the joint between the eleventh and twelfth dorsal vertebræ

Dr L A ROWDEN.

Fig. 94.—FRACTURE-DISLOCATION OF SPINE (See Fig. 58)

Clinical History.—A youth, aged 17, fell from a roof on to his back. both legs were paralysed for three months. He returned to work after two years, wearing a spinal jacket. He walked fairly well.

Radiograph.—There is some irregularity impaction of the third body and marked impaction and dislocation of the fourth and fifth bodies. A primary scoliosis is present. the vertebræ being rotated and deviated, and pelvis tilted.

Note the diminutive lumbar ribs.

Dr O L RHYS.

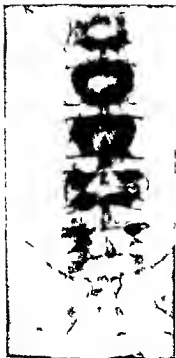


FIG 91



FIG 92



FIG 93



FIG 94

Figs. 95 and 96.—FRACTURED SPINE

Radiographs.—The first lumbar vertebra is the seat of a crush-fracture affecting the right more than the left side, causing scoliosis, well seen in the A.P. view. In the lateral view the anterior part is more affected than the posterior, resulting in kyphosis.

Dr THURSTAN HOLLAND

Late SURGEON-GENERAL

Fig. 97.—FRACTURED RIBS

Clinical History.—This man in the course of his work as a forester was crushed by a heavy root, dragging him into a pit, at the same time pivoting and falling on him. For some time he was unconscious and has no memory of the accident. Any respiration, other than the shallowest, caused stabbing pains; his sputum was bright red.

Radiograph (Oblique)—The fifth, sixth and seventh ribs are fractured in the axillary line, in each case the part attached to the spine is depressed. (The advantage of this position for examination, to avoid the cardiac shadows, is obvious.)

Treatment—The application of two layers of 3-inch strapping with carpet felt between the layers resulted in his being able to resume work in five weeks.

N.B.—A fracture involving only one rib presents grave difficulty in diagnosis, since there is little displacement.

MR W B R. MONTLITH

Fig. 98.—FRACTURE-DISLOCATION OF SPINE (See Fig 28)

Radiograph.—The atlas has retained its connection with the skull, which has been forced forward, carrying with it the odontoid process. The third cervical vertebra has been extensively crushed.

Note—Whilst most of these injuries are fatal, some few escape compression of the cord, owing to the large size of the vertebral canal here.

Dr R. W A SALMOND

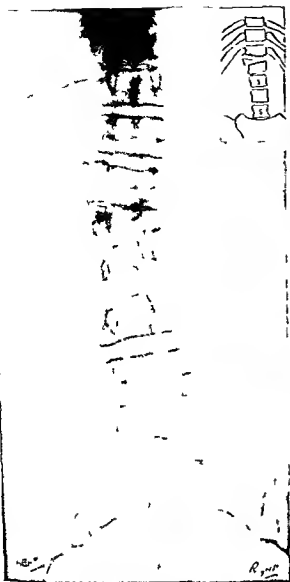


FIG 95



FIG 96



Fig. 99.—FRACTURE: GLENOID PLATE. (See Fig 13)

Clinical History.—This occurred as the result of a motor accident, causing concussion. Since the accident there has been loss of smell and taste, otherwise no other symptoms.

Radiograph.—A fissure is seen starting at the glenoid plate and extending back through the external auditory meatus into the petrous bone. (The mastoid air-cells are well seen.)

N.B.—The commonest form of violence to cause this fracture is a blow on the chin. The loss of the senses of taste and smell was due, no doubt, to disturbance, in the uncinate gyrus, of the fibres passing to it

Late Dr R. KNOX

Fig. 100.—FRACTURE: NASAL BONE

Radiograph.—Towards the termination of the nasal bone a fracture is evident. Without the silhouette process this might be any bone

Dr L. A ROWDEN

Fig. 101.—SKULL: DEPRESSED FRACTURE OF VAULT: BONE-GRAFTS. (See Fig. 13)

Clinical History.—As the result of a gunshot wound the patient sustained a depressed fracture of the vault. The fragments were elevated leaving a wide gap in the occipital region. The patient suffered from severe headaches, and on bending down he felt as if his head would burst; he suffered from bitemporal hemianopia. As the symptoms grew worse it was decided to put a series of bone-grafts in the defect. The operation was eminently satisfactory; all symptoms save the hemianopia disappeared, and he has had no return for two years

Radiograph.—Several pieces of bone are seen bridging the gap in the skull. The defect lies over the occipital lobe of the brain, hence the hemianopia.

Late Mr DOBSON

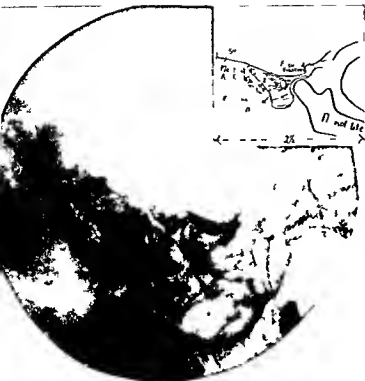


FIG 99



FIG 100

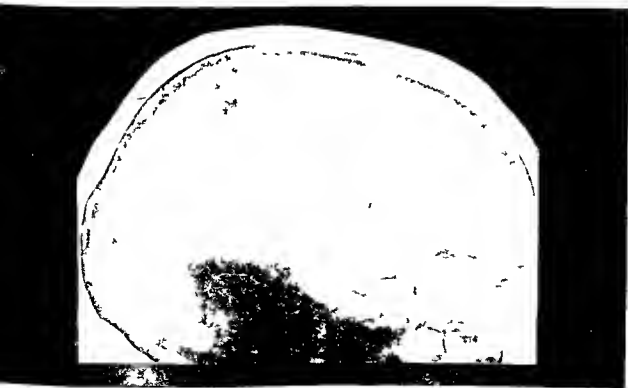


FIG 101

Fig. 102.—MANDIBLE (See Fig. 13)

A transverse fracture of the mandible in the neighbourhood of its angle. The hyoid bone is well seen.

Fig. 103.—MANDIBLE: ANGLE. (See Fig 14)

Silhouette.—Note the marked surface prominence of the angle of the mandible.

Radiograph.—There' is inward displacement of the body of the mandible, following a fracture at the angle.

Fig. 104.—MANDIBLE: BODY. (See Fig 13)

A simple fissure is seen entering the socket of a tooth, extraction was probably responsible for the fracture. Old periodontal inflammation is evidenced by the sclerosis of the floor of the socket.

Fig. 105.—MANDIBLE: BODY. (See Fig 13)

An oblique fracture of the body, near the angle, in an edentulous and atrophic mandible.

N B.—In all but Fig. 104 the bone is seen to be fractured where it changes shape, always a weak point.

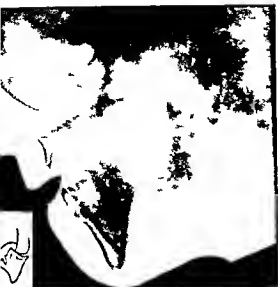


FIG 102



103



104



105

Fig. 106.—CLAVICLE: GREENSTICK FRACTURE OF. (See Fig 48)

Radiograph.—At the commonest site for fracture—viz. the union of the inner two-thirds with the outer third—is a greenstick fracture. The outer fragment has been depressed by the weight of the arm. The periosteum has not been severed, alignment not being lost. Before the advent of X-rays such a fracture could only have been diagnosed with certainty some time later by the appearance of callus. There is some degree of rickets evidenced in the broad epiphyseal line in the humerus. Such was doubtless a predisposing cause.

Nottingham General Hospital

Fig. 107.—CLAVICLE: FRACTURE OF. (See Fig. 48)

Radiograph.—The violence has evidently been greater than in the previous case, the periosteum having parted, the typical dropping and drawing inwards of the outer fragment is visible. There is no suggestion of rickets as a factor.

Nottingham General Hospital

Fig. 108 —CLAVICLE: MIDDLE. (See Fig 15)

Radiograph.—A typical fracture through the middle third of the bone, with depression and adduction of the outer fragment due to the weight of the arm and the pectoral muscles respectively. The humeral head has been rotated somewhat. A comminuted fragment lies between the fragments. The inner fragment is probably drawn up slightly by the sternomastoid.

F TOLLEY.

Mr J L LWIN

Fig. 109.—CLAVICLE: INNER END. (See Fig 27)

The fracture is near the sternal articulation. The inner portion has been drawn somewhat upwards by the sternomastoid muscle, and the outer, downwards as the result of the weight of the arm.



FIG 106



FIG 107



FIG 108



Fig. 110.—SCAPULA: ACROMION. (See Fig. 15)

The acromion has been fractured, probably as the result of direct violence, it must not be confused with the centre of ossification.

Fig. 111.—SCAPULA: GLENOID FOSSA. (See Fig. 15)

The lower part of the glenoid fossa has been separated from the rest of the scapula.

Fig. 112.—SCAPULA: AXILLARY BORDER. (See Fig. 15)

Radiograph—A fracture of the axillary border of the scapula is apparent. (This bone is very rarely fractured.)

F. TOLLIN

MR J. LEWIS.

Fig. 113.—HUMERUS: NECK. (See Fig. 15)

Clinical History—This was the result of a fall on the arm, and occurred in a woman of 57.

Silhouette.—Emphasises a marked swelling of the soft tissues below the fracture. This was due in part to shortening, and partly to compression of the structures below by the bandage.

Radiograph.—The outline of the glenoid fossa is visible. The upper end of the lower fragment lies beneath the coracoid process. The head of the humerus is approximated to the acromion, and its articular surface appears to look outwards.

110



111



113



Fig. 114.—HUMERUS: SURGICAL NECK. (See Fig 15)

Clinical History.—This man, aged 53, fell from his bicycle, and hurt his shoulder. Examination showed no external irregularities. Movement was painful, but fairly free.

Radiograph.—Reveals an impacted fracture of the neck.

After History.—It was treated by fixation of the arm to the chest for ten days and a sling for a similar period, with an excellent result.

Fig. 115.—HUMERUS: SURGICAL NECK. (See Fig. 15)

Observe the irregular fracture of the surgical neck, with the usual adduction of the lower fragment, due to the pectoral muscles.

Fig. 116.—HUMERUS: SURGICAL NECK (See Fig 59)

Radiographs.—An oblique fracture of the humerus in a boy of about 13 years of age. The displacement of the lower fragment may have been prevented by the obliquity of the fracture, but more probably the periosteum has not ruptured.

Note that in Figs. 115, 116 and 117 there is no flattening of the shoulder, nor increase in axillary girth, as in dislocation. (See Fig 6)

Fig. 117.—FRACTURE OF HUMERUS. (See Fig 15)

Radiograph —A bec-de-flûte fracture of the humerus together with some comminution is present. The upper end is adducted by the pectoral muscles, the lower one drawn outwards by the biceps and triceps. This form of fracture is the result of torsion.



FIG 114



FIG 115



FIG 116



FIG 117

Fig. 124.—HUMERUS: LOWER THIRD. (See Fig 17)

Radiograph —The break is situated somewhat lower than in Fig. 118. The obliquity of the fracture probably explains the position of the fragments.

Fig. 125.—HUMERUS: SUPRACONDYLAR. (See Fig. 17)

Silhouette —The arm is bent at a right angle with prominences, behind, due to backward displacement of the forearm, and in front, to the lower end of the humerus

Radiograph —The condylar end of the humerus has maintained its articulation with the radius and ulna and has been carried backwards. A similar injury might well have caused a dislocation, which it resembles.

N.B.—Two serious complications beset such a fracture, viz. the liability to myositis ossificans in the brachialis anticus, usually following excessive or premature movement, and, secondly, Volkmann's ischæmic contracture, which is liable to occur if flexion is instituted before complete replacement of the fracture.

Fig. 126.—HUMERUS: CONDYLE (OLD). (See Fig 17)

Radiograph.—The ulna articulates with the humerus and radius but the latter fails to articulate with the divorced external condyle of the humerus, since the cupped end of the radius is seen. That the condition is old standing is proved by the rounded edges of the external condyle

Fig. 127.—RADIUS: HEAD. (See Fig 17)

Radiograph —The anterior lip of the radial articular head has been torn off

Operation —The loose fragment was removed.

N.B —This is essentially an X-ray fracture, it may be suspected from the pain but is only diagnosable with certainty by X-rays.

124



125



126



127



Fig. 128.—ULNA : OLECRANON. (See Fig. 17)

Radiograph.—The olecranon has been completely separated from the rest of the ulna, a wide gap intervening.

Note how, in this case, flexion—the treatment for most injuries of the elbow—increases the distance between the fragments.

Late Mr THOMPSON

Fig. 129.—ULNA : OLECRANON : AFTER WIRING. (See Fig. 17)

Same case as in Fig 128 Ten days after the injury the bone was wired.

Fig. 130.—GREENSTICK FRACTURE OF RADIUS AND ULNA

Clinical History.—Following a fall, this boy, aged 14, complained of pain and loss of power of the forearm

Silhouette —Called the “wave” deformity, from its dorsal trough on the back of the forearm and ventral crest at the wrist. this is typical of a greenstick fracture of the forearm.

Radiograph —Both bones are broken below but not above, where the periosteum has remained intact. If left untreated new bone would arise under the periosteum, thus tending to straighten the bone, but at the expense of length (see Figs. 193 and 194).



128



129



130

Fig. 131.—RADIUS AND ULNA: SHAFTS. (See Fig 19)

Observe the abnormal concavity on the ulnar border of the forearm due to a fracture of the radius and ulna. The ulna is comminuted and its lower fragment is almost touching the radius and its styloid process is evulsed.

The cause was probably direct violence. If reposition is not effected there will be great danger of cross-union, the callus from both bones fusing (see Fig. 207).

Fig. 132.—RADIUS AND ULNA: SHAFTS. (See Fig 19)

Silhouette.—Note a marked prominence above the wrist due to the upper fragment of the radius. The lower fragment is pronated and adducted towards the ulna by the pronator quadratus. The ulna is broken, but continuity is not lost.

Unlike Fig. 131, the bones being broken at a different level, the cause of the break was indirect violence, as by falling on the hand.

Fig. 133.—COLLES'S FRACTURE: A.P. (See Fig 17)

Clinical History.—A woman, aged 49, stumbled and, to break her fall, held out her hand, resulting in great pain and loss of power.

Silhouette.—The hand is deflected outwards.

Radiograph.—Almost the whole of the lower end of the radius has been evulsed, its shadow being imposed on that of the shaft. The styloid processes are at the same level, a clinical sign of this fracture.

Fig 134.—COLLES'S FRACTURE: LATERAL. (See Fig 18)

Same case as Fig. 133

Silhouette —Note the distinct "dinner-fork" deformity of the wrist

Radiograph —The wrist and hand have been carried backwards, thus accounting for the "dinner-fork" deformity. The radius is impacted.

N B —The undoing of the backward displacement is essential, otherwise the extensor tendons are liable to adhesions. Moreover, stresses and strains may result in rheumatic changes in later life.



131



132



133



134

Fig. 135.—RADIUS: COLLES'S FRACTURE: AFTER TREATMENT: A.P. (See Fig. 19)

Silhouette.—The radial deviation has disappeared.

Radiograph.—Almost perfect alignment has been attained; the styloid process of the radius is now lower than that of the ulna. Callus is responsible for some patchy areas of calcification, no overlapping is present.

Fig. 136.—COLLES'S FRACTURE: LATERAL. (See Fig. 18)

Same case as Fig. 135.

Silhouette.—The "dinner-fork" deformity of Fig. 134 has been corrected.

Radiograph.—The position of the fragments is well-nigh perfect.

Fig. 137.—RADIUS: CHAUFFEUR'S FRACTURE: A.P. (See Fig. 19)

Clinical History.—This fracture, in a man aged 19, was caused by the backfire of a car, the crank being wrongly held between the fingers and thumb. Great pain and loss of use followed; swelling was the only deformity.

Radiograph.—The end of the radius shows an oblique fracture, commencing half-an-inch above the styloid process, and ending about the middle of the joint. The force of the blow has been transmitted from the thumb via the trapezium and scaphoid to the radius. The great pain is due to the fracture extending to the joint, movement of which is impossible without the fragments grating.

This fracture occurs only as the result of this particular accident, just as fracture of the astragalus has only become frequent with the advent of the aeroplane rudder.

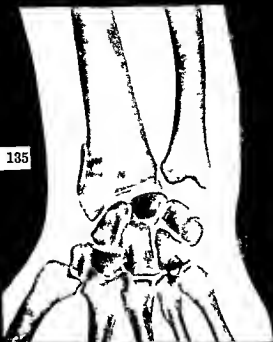
N.B.—This accident can be avoided by keeping the thumb and fingers on the same side of the handle; a back-fire in this position causes the thumb to slip off the handle, harmlessly.

Fig. 138.—RADIUS: SMITH'S FRACTURE (See Fig. 18)

Clinical History.—The patient fell with his arm under him

Radiograph.—This is exactly the reverse of Colles's fracture, the lower fragment being carried forward.

N.B.—This fracture would appear to be commoner than is generally supposed.



135



136



137



138

Fig. 139.—DISLOCATED AND FRACTURED FIRST METACARPAL. (See Fig. 49)

Clinical History.—The patient, a boy of 13, sustained a blow on the thumb. Undue mobility and pain at the base of the thumb were noted.

Radiograph.—A separated epiphysis, with fracture, of the first metacarpal is apparent: the distal portion is displaced backwards: part of the diaphysis has remained with the epiphysis.

Treatment—Reduction of the deformity and the use of a grooved splint proved successful.

N.B.—The anterior-posterior view was normal in appearance: thus emphasising the need for X-raying in two planes.

Fig. 140.—IMPACTED FRACTURE OF FIRST METACARPAL. (See Fig. 6)

There is an impacted stove fracture of the base of the thumb, probably the result of a force transmitted up that bone.

Fig. 141.—SCAPHOID. (See Fig. 19)

Radiograph.—A complete fracture is seen crossing the “waist” of the scaphoid. It occurred a year before, and was still causing pain and weakness.

The most successful treatment is removal of the loose fragment.

Fig. 142.—SEPARATED EPIPHYSIS OF PHALANX. (See Fig. 49)

Clinical History.—The condition simulated an inward dislocation, but the diagnosis was clinched by the detection of soft crepitus.

There has been a separation of the epiphysis of the phalanx, which has torn off a wedge of the diaphysis. (See Fig. 182.)

Fig. 143 —PHALANX (See Fig. 6)

A comminuted impacted fracture of the second phalanx is seen

Fig. 144.—BENNETT'S FRACTURE. (See Fig. 6)

Occurred as the result of a fall on the thumb. There was no deformity, but intense pain.

Radiograph.—The essential of a Bennett's fracture is an oblique crack extending into the joint, detaching a chip of bone. The cause of the pain is the impossibility of any movement of thumb, index, or wrist without rubbing of the bone surfaces (*cf.* Chauffeur's Fracture, Fig. 137). They are common among baseball players, many digits being affected.



139

140



141



142

143



144

Fig. 145.—PELVIS. (See Fig. 20)

Clinical History.—The patient, a woman, aged 57, of unsound mind, jumped out of a window. Signs of fractured pelvis were manifest, but with no rectal or vesical complications.

Radiograph —The whole of the ischium is detached, both at the acetabulum and at the conjoined ramus; it is twisted so that it is seen end-on. The pubis has been fractured close to the acetabulum

MR COLLINSON.

Fig 146.—TIBIA: POTT'S FRACTURE: A.P. (See Fig 25)

Clinical History.—The patient fell after colliding with a telegraph pole.

Silhouette —Swelling on both sides of the ankle is seen.

Radiograph.—The inverted U-shape of the ankle joint has been obscured, more especially on the outer side, a feature which should always arouse great suspicion.

MR C W DIXON

Fig. 147.—POTT'S FRACTURE (See Figs. 24 and 25)

Same case as Fig. 146.

Radiograph.—A serious state of affairs is manifest, the tibia and fibula have been subluxated forwards, leaving both malleoli attached to the astragalus, which bone is mushroomed.

N.B.—This case shows the value to be placed on any variation in the inverted U of the antero-posterior view.

MR C W DIXON



Fig 145



Fig. 152.—INTRACAPSULAR FRACTURE OF THE NECK OF THE FEMUR.

(See Fig. 20.)

Radiograph.—The head of the femur lies in the acetabulum, the lower lip of which is fractured. The shaft of the bone has been drawn upwards and inverted by the psoas, rendering the digital fossa visible. The femur is somewhat rarched, a condition predisposing to fracture from slight violence.

N.B.—This fracture is often impacted, so firmly, indeed, that the patient may hobble home, the diagnosis being made days afterwards.

Nottingham General Hospital.

Fig. 153.—EXTRACAPSULAR FRACTURE OF THE NECK OF THE FEMUR.

(See Fig. 20.)

Radiograph.—The cause of this fracture was great violence, very different from that of the preceding. The femur has been fractured through a strong part, the great trochanter. The lesser trochanter has been avulsed and drawn upwards by the psoas. The fracture would appear to be impacted, the neck being driven into the trochanter and fixed there. Eversion has brought the tip of the great trochanter into close proximity to the acetabulum.

Nottingham General Hospital.

Figs. 154 and 155.—FRACTURE: NECK OF FEMUR: SMITH-PETERSEN PIN

Clinical History.—A woman sustained a fracture of the femoral neck at the age of 67, and was operated upon a week later.

Radiograph.—Fig. 154 (Printed wrong side).—The pin has been inserted in excellent position. These pins are made of vitallium, an alloy which does not rust or set up electrical currents, and so do not set up rarfaction and become loose as do ordinary screws and plates.

Subsequent History.—Nine months later slight inflammatory changes suggested the removal of the pin.

Radiograph.—Fig. 155.—The pin has been removed, a slight diminution in density marks its site, bony trabeculae are continuous from the neck to the head, proving union.

Later History.—She walked perfectly after the pin was removed, but died two years later of a carcinoma of the breast.

N.B.—The method represents the latest in the treatment of this, the *bête noire* of fractures. The age of the patient and the rarched nature of the bones both contribute to the difficulties.

LIEUT. F. H. FARMER.

MR J. O. HARRISON.



FIG 152



FIG 153



FIG 154



FIG 155

Fig. 156.—FEMUR: SHAFT: BEC-DE-FLÛTE: RECENT

Occurred in a boy of 8. It is a torsion fracture of the “bec-de-flûte” variety, about the middle of the femur, with considerable overriding

Fig. 157.—FEMUR: SHAFT: OLD

This fracture occurred some four weeks previously.

Silhouette.—Note the prominence on the outer side of the thigh due to the underlying fracture.

Radiograph.—This might well be the appearance of Fig 156 after four weeks. Contrast the rounded ends of the fracture with the sharp ends of Fig. 156. Between the overlapping fragments is dense callus. The end of the lower fragment is uniting outside with the upper one. Union will be complete soon, but there will be two inches of shortening.

Fig 158.—FEMUR: INJURY OF LOWER EPIPHYSIS: TRAUMATIC GENU VALGUM.

(See Fig. 63)

Clinical History.—Occurred in a girl, aged 13, after a fall in the school playground.

Silhouette.—Notice the marked projection on the inner side of the knee.

Radiograph.—The inner part of the lower epiphysis of the femur is normal, whilst the outer part is indefinite and its depth much reduced. Thus, to maintain contact of the bones, the leg has projected laterally. Note the shadow of the patella, which bone is in danger of outward dislocation.

There is a marked spur of bone at the site of insertion of the internal lateral ligament on the tibia. This projection is of frequent occurrence in rickets.

Late Mr Daw



158



157



156

Fig. 159.—LOOSE BODY IN KNEE-JOINT, RESULTING FROM FRACTURE
(See Fig. 22)

Radiograph.—Note a round ossified body in the joint. In the absence of other disease in the joint it must be surmised that it took origin in a bony flake torn off the patella as the result of an accident.

Fig. 160.—RUPTURED LIGAMENTUM PATELLÆ. (See Fig. 22)

Radiograph.—Observe the great distance between the patella and the tubercle of the tibia. A small piece of the front of the tibia above the tubercle has been torn away.

Fig. 161.—PATELLA. (See Fig. 22)

Clinical History.—In this case there was the usual history of sudden effort at extension, followed by collapse and inability to extend the limb.

Silhouette.—Note the transverse groove on the surface over the site of the patellar fracture.

Radiograph.—The two fragments of the patella are separated by a wide gap, and the lower one is rotated so that its fractured surface is directed forwards.

A.P.B., *Lancet*, 6th October 1923.

Late Mr THOMPSON

Fig. 162.—PATELLA. (See Fig. 22)

This was due to direct violence.

Silhouette.—Note the normal contour of the knee, save for some swelling over patella.

Radiograph.—The patella is the site of a stellate fracture. Very little separation has occurred, owing to the dense periosteal and tendinous covering remaining intact. The separation of the patella from the femur indicates the presence of fluid in the joint.



159



160



161



162

Fig. 163.—HEAD OF TIBIA. (See Fig 20)

Radiograph.—A wedge comprising almost the whole of the condylar surface of the tibia has separated from the rest. The articular surface of the condyle presents gross irregularities.

The fracture was probably caused by adduction of the leg. With modern methods a stiff joint should be avoided.

N.B.—A fracture of the posterior lip of the tibia is common among parachutists.

Nottingham General Hospital

Fig. 164 —CALLUS: FRACTURED FEMUR

Judging by the epiphysis the patient was about 18 years old.

Radiograph —The femur has fractured some four inches above its distal end, with marked angulation. Dense callus joins the distal fragment to the side of the shaft. Marked rarefaction is visible in the lower end of the upper fragment. Eventually alinement will be affected, but at the expense of some length. Note that the callus has developed on the side of the lesser angle, where the periosteum would be almost intact; none is present on the other side, where it is mangled.

Fig. 165.—TIBIA AND FIBULA: SHAFTS: BEC-DE-FLÛTE

Radiograph —There is a fracture of the “bec-de-flûte” variety of both tibia and fibula, with some overlapping in both cases. The manner in which the bones are fractured points to torsion being the cause, both bones being fractured at the same level, however, suggests direct violence.

Fig. 166.—FIBULA: SHAFT

Clinical History —The patient complained of pain on the outer side of the leg when walking, following a blow there. On examination, attempts at “springing” the bone were unsuccessful and painful.

Radiograph.—The fibula is seen to have suffered a comminuted fracture, but the periosteum has held, preventing displacement.



FIG 163



FIG 164



165



166

Fig. 167.—TIBIA: SHAFT: GREENSTICK

There is no deformity of the leg.

Radiograph —A simple fissure is seen, and about half an inch below is one of greater intensity, which has permitted some displacement. Probably the periosteum was intact in the first case and ruptured in the second, it has evidently held, enough to keep the fragments in position.

Fig. 168.—TIBIA AND FIBULA: SUPRAMALLEOLAR. (See Fig 55)

A patient aged about 10.

Silhouette —The leg is bent, with its convexity outwards

Radiograph —Both tibia and fibula are the seat of greenstick fractures, that of the tibia commences one inch above the epiphyseal line, extending outwards and downwards to the tibio-fibula joint; that of the fibula is about two inches above the malleolus. The periosteum has held the fragments together.

Fig. 169.—FIBULA: POTT'S FRACTURE (LAT.). (See Fig 24)

Occurred as the result of a slip off the pavement

Radiograph —An oblique fracture of the fibula is apparent, with a quarter of an inch of shortening.

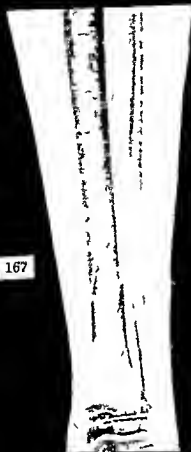
N.B —The divorced centre of ossification of the external tuberosity of the astragalus, the os intermedium of the embryologists, is seen. That it was not the result of injury could have been proved by finding it in the other ankle. (I have found it present in a large number of ankles —A.P.B.)

Fig. 170.—TIBIA AND FIBULA: POTT'S FRACTURE (A.P.). (See Fig 25)

Same case as Fig 169

Radiograph —The foot has been everted, causing the astragalus to be driven against the external malleolus, thus fracturing the fibula two inches above and causing the tip of the internal malleolus to be snapped off, whilst retaining contact with the astragalus

Note —The inverted U of the joint is broken by the tip of the tibial malleolus. This is a mild Pott's fracture compared with Fig 146, in which a dislocation had occurred



167



168



169



170

Fig. 171.—TIBIA AND FIBULA: POTT'S FRACTURE (A.P.) (See Fig. 25)

The foot has been wrenched outwards

Radiograph —The same forces have been acting as in Fig 169, but the violence has been far greater. The fibula has been comminuted and its periosteum torn off. The tip of the tibial malleolus has been evulsed from the rest of the bone and has maintained contact with the astragalus. The inferior tibio-fibula ligament has been ruptured, evidenced by the wide separation of the bones. The inverted U of the joint is grossly deformed.

Fig. 172.—TIBIA AND FIBULA: POTT'S FRACTURE (LAT.). (See Fig. 24)

Same case as Fig. 171.

Radiograph —The tibia is seen perched on the top of a compression fracture of the astragalus. Behind the tibia is a spike of the fibula.

Fig. 173 —OS CALCIS (See Fig. 24)

Clinical History.—Within half an hour two men decorating the General Infirmary at Leeds fell, each sustaining this comparatively rare fracture.

Silhouette —Note the swelling of the heel.

Radiograph —The os calcis is the seat of an extensive crush fracture.

Late Mr R. LAWFORD KNAGGS

Fig. 174.—FRACTURED METATARSAL. (See Fig. 26)

Radiograph —No notes were available but the condition may well be a "marching fracture," as only one bone is affected. Frequently the injury is recognised only when callus makes its appearance, after ten days or more.

Fig. 175.—MARCHING FRACTURE. (See Fig. 26)

Clinical History —The woman, aged 35, complained of pain on walking which came on after carrying twelve-pound baskets of plums on somewhat rough ground.

Radiograph —A crack is apparent in the third metatarsal with little displacement.

This was the first to be described of a whole series of fatigue fractures, the literature of which is now extensive, the Army having provided numerous instances, some being diagnosed only when callus has appeared.

Mr A. P. BERTWISTILL



Fig 171



Fig 172



Fig 173



Fig 174



Fig 175

Fig. 178.—METATARSALS, SECOND AND THIRD (See Fig. 26)

Radiograph—The second and third metatarsal bones are fractured transversely at their weakest point. The fracture was the result of a weight falling on the foot.

Note the stellate fracture of the internal sesamoid of the hallux.

Fig. 179.—EXTERNAL SESAMOID OF GREAT TOE (See Fig. 26)

This occasioned pain on walking.

A transverse fracture of the external sesamoid of the great toe, with separation of the fragments superimposed on the head of the hallux metatarsal.

Fig. 180.—HALLUX: PROXIMAL PHALANX. (See Fig. 26)

A weight fell on this man's toe.

Radiograph.—There is a splintered fracture of the waist of the hallux. Degenerative changes are seen in many of the phalangeal and metatarsophalangeal joints.

Fig. 181.—HALLUX, UNTREATED. (See Fig. 26)

Clinical History.—Five weeks previously the man, aged 45, sustained an accident for which he now sought advice.

Radiograph.—There is a transverse fracture of the proximal phalanx of the great toe, round which is a considerable amount of dense callus. Note the slight rarefaction of the bone beyond.

Nottingham General Hospital



FIG 178



FIG 179



FIG 180



FIG 181

Fig. 182 —SEPARATED LOWER EPIPHYSIS OF HUMERUS

Clinical History.—The patient, a boy of 12, fell on the point of the elbow, and as a result it became greatly swollen and discoloured, blisters formed.

Silhouette.—Observe the swelling and characteristic attitude, midway between flexion and extension.

Radiograph.—The lower epiphysis of the humerus has been separated from the rest of the bone, and has torn with it a flake of the diaphysis. The displacement is similar to that in Fig. 125. All the complications mentioned there are particularly prone to follow.

Fig. 183.—SEPARATED LOWER EPIPHYSIS OF HUMERUS: AFTER TREATMENT

A similar case to the above. Gas was administered, and, after a preliminary slight extension to disengage the surfaces, full flexion was made. This was maintained by a figure-of-eight strapping, and bandage. Note the position of flexion and the good alinement of the fragments obtained thereby.

N.B.—Immersion of the elbow in warm water up to the dressing gives great relief and prevents complications.

Fig. 184 —EXCESSIVE CALLUS ON ULNA. (See Fig 17)

Clinical History.—A woman of 47 gave a history of a slight knock on the arm some six weeks before. She thought nothing more of it until a week later, when a lump appeared, which became painful. Examination revealed a hard, somewhat inflamed tumour over the ulna. A diagnosis of sarcoma—with spontaneous fracture—was provisionally made.

Silhouette.—Note swelling over the ulna.

Radiograph —A fracture can be seen traversing extensive callus, the amount of which is the direct result of neglect, which permitted movement.

Unable to come in at once, she returned three weeks later with the tumour about the same size. A diagnosis of callus was then made, which was confirmed by the microscope.

Late Mr RICHARDSON

Fig. 185.—CALLUS ON ULNA. (See Fig 50)

This occurred in a child of about 12

Radiograph.—A fracture with angulation is seen. On the side of the lesser angle, where the periosteum would be intact, callus is forming, whilst none is present on the opposite side, where the periosteum would be disrupted. The external condyle has lost contact with the radius.



REPAIR OF FRACTURES

Fig. 186.—PLATING OF TIBIA

Radiograph.—A plate and four screws have been applied to a fracture of the tibia. The bottom two screws show rarefaction in their vicinity which has led to movement, evidenced by excessive callus in the case of the fibular fracture. There is no callus on the side of the plate, but a certain amount on the opposite side.

Subsequent History.—The plate was removed and a bone graft applied with excellent results.

Nottingham General Hospital

Fig. 187.—PLATING OF HUMERUS

Radiograph.—A plate has been applied to a fracture of the humerus. Unlike the above, little rarefaction is in evidence round the screws. No callus is present round about the plate, but on the opposite side there is an excessive amount, due, in part, to the presence of two small fragments and partly to excessive movement, the plate being too short to impart immobility.

Fig. 188.—BAND ON HUMERUS. (See Fig. 51)

Clinical History.—The patient had a separation of the epiphysis when 8 years old, and this band was introduced. Two years later movement was becoming less free, and painful. A sinus had appeared.

Radiograph.—Note the band encircling the humerus. Above it there has developed a spur of bone on both sides; the larger is suggestive of myositis ossificans.

Fig. 189.—WIRING OF FRACTURE

Radiograph.—Tibia and fibula have been fractured at the same level indicating direct violence. Judging by the pointed, atrophic nature of the bones, it is long-standing. Two wires have been introduced to join the tibial fragments, the bone below the upper wire has by slipping and atrophy, escaped from the wires.

Note the transverse striæ, evidence of past illnesses (H. A. Harris)

Colonna has described this fracture, noting the failure of all treatment save bone-grafting.



FIG 186



FIG 187



FIG 188

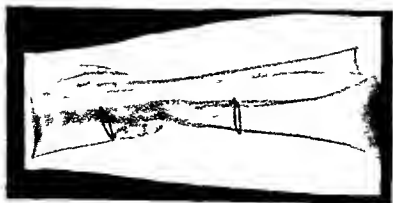


FIG 189

REPAIR OF FRACTURES

Fig. 190.—PLATING OF FEMUR

Clinical History.—Twelve years ago, this man, now aged 39, had his femur plated; then one week before admission it became painful.

Radiograph.—The shaft of the femur is the seat of enormous new bone formation, indicating that excessive movement has occurred. A short plate is visible, the lower portion of which is secured by three screws in excellent position and showing no rarefaction; the upper part lies free, only one screw is in position, and the bone around it is absorbed, the other two screws serve no purpose.

Late F H FRIER

Mr J O HARRISON

Fig. 191.—BONE GRAFT, TIBIA

Radiograph.—The tibia and fibula have been fractured some time previously, evidenced by the callus knitting the fibula and by the rounded nature of the ends of the fragments. It was decided to put in an inlay graft in the space. (This is not an intramedullary graft, which the appearance suggests.) The graft shows some rarefaction as is always the case with a successful result, being brought about by the entry of blood vessels the cells of which, being in contact with a calcium deposit, will form new bone later. (A P B.: *The Rôle of Chemotaxis in Bone Growth*, p 19.)

Late Sir ROBERT JONES

Fig. 192.—BONE GRAFT TIBIA

Same case as Fig. 191.

The fibula has united, a medullary canal is being formed. The rounded ends of the tibia are in contact, the graft bridges the gap for some distance on each side, alignment is excellent.

Late Sir ROBERT JONES



FIG 190



FIG 191

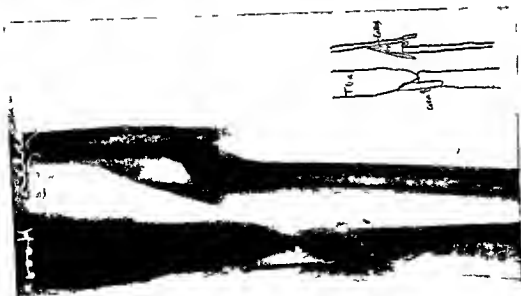


FIG 192

REPAIR OF FRACTURES

Fig. 193.—CALLUS ON RADIUS AND ULNA

Radiograph.—Both bones are the seat of fracture of the greenstick type. Along the inner border of each is dense callus where the periosteum has retained contact with the bone. On the outer side of the fracture where the periosteum has been evulsed there is hardly any. (See *The Rôle of Chemiotaxis in Bone Growth*, p. 40, 1937, A P.B.)

Fig. 194.—CALLUS ON RADIUS AND ULNA

A similar condition to the preceding.

Fig. 195.—SEPARATED EPIPHYSIS: SUPRACONDYLAR PROCESS. (See Fig 51)

Radiograph.—An anterior separation of the lower humeral epiphysis is apparent, accompanied by some comminution.

About two inches above the elbow is a stout, sessile supracondylar process. In the feline tribe this is represented by a foramen through which pass the median nerve and a branch of, or the whole of, the brachial artery; it is present in lemurs, the lowest order of primates. To its extremity is attached Struthers' muscle or ligament, which arises between the long head of the triceps and the latissimus dorsi (Keith).

Mr E J BARBER

Mr A P BERTWISTIE

Fig. 196.—SAME CASE 10 DAYS AFTER ACCIDENT: OBLIQUE LATERAL

The space originally occupied by the diaphysis is now almost radiolucent, being occupied by blood-clot, in which some calcification is occurring. The diaphysis lies behind the epiphysis, whilst the epiphysis retains its connection with the joint.

Mr E J BARBER

Mr A P BERTWISTIE

Fig. 197.—SAME CASE 10 DAYS AFTER ACCIDENT: A P. VIEW. (See Fig 50)

A radiolucent space, originally occupied by diaphysis, in which are vague opacities, is seen in relation to the epiphysis, they are due to commencing calcification of the blood-clot.

The diaphysis, which has torn through the internal and posterior aspect of its periosteal sheath, lies internal to the joint.

Mr E J BARBER.

Mr A. P. BERTWISTIE.



FIG 193



FIG 191



FIG 195



FIG 196



FIG 197

Fig. 198.—23 DAYS AFTER ACCIDENT: A.P. (See Fig. 46)

The large granuloma visible on the inner side of the elbow is obviously due to the projection of the sharp lower end of the diaphysis. The space originally occupied by the diaphysis is in places radiolucent, but the opacities noted in Fig 197 have grown much denser and are larger in area. Calcification is very definitely taking place.

Mr E. J. BARBER.

Mr A. P. BERTWISTLE.

Fig. 199.—23 DAYS AFTER ACCIDENT: OBLIQUE LATERAL. (See Fig. 45)

A faint shadow reveals a disappearing supracondylar process; the end of the diaphysis shows rarefaction, the circular opacity in its neighbourhood is caused by granuloma.

Mr E. J. BARBER.

Mr A. P. BERTWISTLE.

Fig. 200.—44 DAYS AFTER ACCIDENT: OBLIQUE LATERAL

There is much less difference between the density of the diaphysis and new bone, partly due to increase in density of the new shaft and partly to absorption of the original bone, particularly is this noticeable in the bone projecting into the granuloma, which has become pedunculated. In places there is evidence of trabeculation characteristic of true bone.

Mr. E. J. BARBER.

Mr A. P. BERTWISTLE.

Fig. 201.—44 DAYS AFTER ACCIDENT: OBLIQUE LATERAL

In the picture there is no doubt that true bone has made its appearance by the typical "graining" apparent. The granuloma has diminished in size. The new bone has almost the density of the old.

Mr E. J. BARBER.

Mr A. P. BERTWISTLE.

Fig. 202.—1½ YEARS AFTER ACCIDENT: OBLIQUE LATERAL

There is little difference in opacity between new and old bone. Whilst the graining of the new bone is close, that of the redundant old bone is coarse, due to rarefying processes.

Mr E. J. BARBER.

Mr A. P. BERTWISTLE.

Fig. 203.—1½ YEARS AFTER ACCIDENT: OBLIQUE LATERAL

The original bone shows further signs of rarefaction and will become absorbed, leaving the shaft with a semblance of its previous shape.

Mr E. J. BARBER.

Mr A. P. BERTWISTLE.

This gross surgical failure provides a remarkable example of what has often been denied—viz. the formation of bone from periosteum through the medium of calcified blood-clot.

Clinical History—The girl, aged 12, was examined one hour after falling from a see-saw, when she was found to have an anterior displacement of the lower humeral epiphysis and a supracondylar process. After manipulation the arm was put up in flexion. A lateral radiograph showed the bones to be apparently in good position. She developed a huge crop of blisters and had intense pain, also an ulnar paralysis. Ten days later she was again X-rayed, and in an attempt to see the supracondylar process it was realised that instead of the parts being in position the diaphysis was internal to and behind the epiphysis, its original site being radiolucent, a condition the danger of which is emphasised by Cotton. Subsequently a large granuloma developed behind and on the inner side of the elbow. She acquired considerable range of movement but there was grave deformity, the ulnar paralysis persisted, but improved. When the granuloma healed an osteotomy was performed with fair results. (See *The Role of Chemotaxis in Bone Growth*, pp 38-42, 1937, A P B.)



FIG 198



FIG 199



FIG 200



FIG 201



FIG 202



FIG 203

COMPLICATIONS OF FRACTURES

Fig. 204.—FALSE JOINT: TIBIA AND FIBULA. (See Fig 24)

Clinical History.—The patient, aged 57, had an osteotomy performed when young, presumably for rickets, the bones not uniting. Examination showed painless movement between the two fragments. Observe the displacement of the foot backwards.

Radiograph.—There is marked posterior lipping of the opposed surfaces, and an absolute break in the continuity of the two fragments. The direction of the articular surfaces of the ankle is altered, predisposing to osteo-arthritic changes.

Fig. 205.—VICIOUS UNION OF CLAVICLE. (See Fig 15)

Radiograph.—The clavicle has been broken, and apposition of the fragments has not been attained. The result is that the medullary cavity is not continuous, the bones being joined by a bridge of ossified callus and a comminuted piece of the clavicle: a source of weakness.

Fig. 206.—NON-UNION OF RADIUS

Clinical History.—The patient, a healthy man of 27, suffered a compound fracture of the radius and the ulna—the wound being on the radial side. Sepsis supervened, and the condition after six months is here shown. The ulna has united.

Observe that there is no evidence of the formation of callus; the ends of the radius are hazy, and a triangular sequestrum is present.

Note the Carrel's tubes and the glass connector. Lead glass is very opaque to the rays, so that it can be readily demonstrated in the tissues.

Fig. 207.—CROSS-UNION

A gunshot wound of the forearm which became septic.

Radiograph.—The two segments of the radius have united through the medium of dense callus. The callus thrown out has involved the upper end of the ulna, which subsequently became united to the radius. The distal part of the ulna is atrophic, and its proximal end is pointed. There are present some pieces of necrosed bone.



204



205



206



207

AMPUTATIONS

Fig. 208.—ATROPHY OF BONE. (See Fig. 15)

Silhouette—The arm has been amputated in its upper third. The muscular covering is good

Radiograph.—The shaft is very thin, whilst the head is normal, save for some absorption of lime salts. The cause of the atrophy may be disuse; sometimes this is so extreme as to render the bone of a stump liable to fracture from slight cause. Whether the alteration in the blood-supply following operation has any bearing is doubtful.

Fig. 209 —NECROSIS. (See Fig. 64)

Clinical History—The patient was about 15 years of age. Amputation of the leg had been performed at the site of election.

Radiograph.—The femur, patella, and tibia are all rarefied. The sawn end of the tibia is extremely indefinite, the bony shadow passing imperceptibly into the flesh; a round sequestrum is present behind.

Fig. 210 —SPUR

Radiograph.—The covering of the stump is inadequate, and from both sides, but particularly the left, project spurs of bone. The sawn end of the bone is undergoing rarefying osteitis

Some surgeons advocate stitching the periosteum over the cut ends to prevent these spurs arising, but the cause is probably sepsis. They occasion great pain.

Fig. 211.—ATROPHY OF COVERING

Clinical History.—The patient, a lad of 14, had a smash six months before, and amputation in the middle of the arm was necessary. Everything went well for four and a half months, when he knocked the stump, as a result of which there was a copious purulent discharge with agonising pain

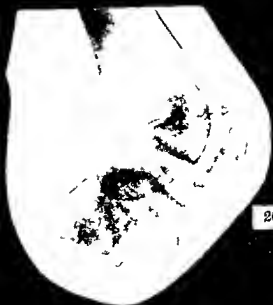
Radiograph—Note the conical stump, with the end of the bone protruding through the skin. It is rarefied and, proximal to the rarefaction, there is some sclerosis before normal bone is reached

Re-amputation was done. The bone was found to be very friable. The main nerves of the arm were involved in fibrous tissue, and each terminated in a bulbous extremity.

208



209



210



211



Fig. 212.—**ATROPHY OF TARSUS.** (See Fig. 24)

The tarsal bones appear as ghosts of normal bones, their dark margins contrasting strangely with their centres.

Fig. 213.—**RHEUMATOID ARTHRITIS: ATROPHY OF FINGER: GOUT.** (See Fig. 6)

Radiograph.—At the tips of the thumb, index and little fingers are lime deposits. The ungual phalanx of the middle finger is pointed and atrophic. The interphalangeal joints and that of the middle metacarpophalangeal and interphalangeal joints are narrowed preparatory to ankylosis.

Fig. 214.—**ATROPHY OF FOOT (CHARCOT'S).** (See Fig. 26)

Clinical History.—The patient had several ulcers of the feet; the Wassermann reaction was positive.

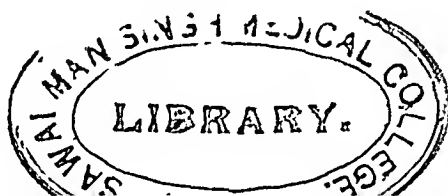
Radiograph.—The ungual phalanx of the hallux has been almost absorbed and has fused with the proximal phalanx; the hallux metatarsal shows new periosteal bone formation. The interphalangeal joints are in process of fusion as the joint spaces are disappearing. The second metatarso-phalangeal and the third, to a less extent, are disorganised, probably they are the sites of ulcers.

Fig. 215.—**ATROPHY OF TIBIA AND FIBULA.** (See Fig. 55)

Radiograph.—Both bones show evidence of having been broken some time ago, their ends being rounded, there is no attempt at repair in either case.

The radiograph was taken some time after wiring. The transverse markings, seen less distinctly in Fig. 189, are evidence of previous illnesses. The whole appearance simulates Fig. 189, it may well be that Fig 204 belongs to the same category.

N B —The condition is well described by Colonna (page 16)



212



213



214



215



Fig. 216.—SYPHILITIC METACARPAL. (See Fig 6)

Radiograph.—Ensheathing the ring metacarpal is a mass of new, periosteal bone.

Fig. 217.—PERIOSTEAL WHITLOW. (See Fig 6)

Clinical History—The man, aged 60, complained of agonising pain and copious mattery discharge from the thumb

Silhouette—Note characteristic bulbous appearance of the thumb

Radiograph—The whole of the end of the ungual phalanx, with the exception of a few small sequestra, has disappeared

A P B, *Lancet*, 6th October 1923

Fig. 218.—TUBERCULOUS DACTYLITIS. (See Fig 49)

Clinical History—The patient, aged 15, had a discharging sinus on the third finger. There was no pain or history of injury

Radiograph—The shape of the finger, thick at the root, and tapering to the tip, where its diameter is equal to that of the little finger, is very characteristic. The density and defined edge of the remains of the shaft suggest that, although a small sequestrum is present, the disease is tending to recovery. Compare the density and size of the epiphysis with the corresponding one of the little finger.

Late Mr THOMPSON

Fig. 219.—SYPHILITIC METACARPALS. (See Fig 40)

Clinical History—A child, aged 2, had a history of "snuffles," but was otherwise healthy until a swelling appeared on the dorsum of the hand. This developed into an abscess. Whilst in hospital the child's right knee, right leg, and finally gums, successively became swollen, and then resolved.

Radiograph—Mark the great increase in girth of the second and fifth metacarpal bones, due to subperiosteal new bone formation, within which the original bone is seen.

Late Mr DOBSON

Fig. 220.—PYOGENIC DACTYLITIS (See Fig 6)

Clinical History—Sepsis followed a compound fracture of the little finger

Silhouette—The digit resembles a thumb

Radiograph—The proximal phalanx is fractured near its base, its distal fragment has been carried inwards. A ring of dense calcification separates the hazy bone, around the fracture, from the healthy bone beyond.

Fig. 221.—TUBERCULOUS METACARPAL: "COFFIN BONE" (See Fig 40)

Radiograph—The "coffin bone" so minutely described by the late Mr Lawford Knaggs is seen here to perfection. A large abscess has developed under the periosteum, which has been raised, and which has formed a bony shell around the original bone, which lies like a corpse in a coffin.

Late Mr LAWFORD KNAGGS

216



217



218



219



220



221



Figs. 222 and 223.—SOUND AND TUBERCULOUS KNEES

Silhouette.—Note the marked wasting of the left thigh and calf muscles, and the flexion of the knee which was fixed.

Radiograph.—The epiphyseal lines in the diseased femur are grossly irregular; the tibia has become flexed and rotated, whilst the patella is about to ankylose to the femur. For some distance the shaft of the femur shows rarefaction and is bending forwards, which deformity suggests prolonged duration of the disease. The forward arching of the femur may have been due either to the retention of the partially fixed joint on a back splint, or to the child's having been allowed to walk, the soft bone yielding.

Dr L. A. ROWDEN

FIG 224.—TUBERCULOUS KNEE: A P. and LAT. (See Fig 44)

Clinically.—No history; child came in plaster case.

Treatment.—Plaster reapplied and walking allowed. One year later the knee was erased and patella lightly sutured. Plaster was reapplied for one month, when the leg was found to be quite firm, some flexion was possible, so a caliper was fitted

Radiograph (10 months after operation)—The bones in the vicinity of the joint are somewhat rarefied. The epiphyseal lines are irregular and across all bones are transverse stræ, evidence of previous illnesses. A tendency to backward subluxation of the knee is evident in the lateral radiograph.

Royal National Orthopædic Hospital

Late Mr J. B. BARNETT





FIG 222



FIG 223



FIG 224

Fig. 225.—NECROSIS OF METACARPAL. (See Fig. 6)

Clinical History.—A chronic, discharging sinus resulted from injury with a circular saw.

Radiograph.—The distal articular end of the first metacarpal has disappeared save for a small sequestrum. The rest of the metacarpal is condensed.

Fig. 226.—MYELOMA OF PHALANX. (See Fig. 6)

In the middle of the second phalanx is a radiolucent tumour with trabeculae projecting from the sides. It may be readily confused with an enchondroma (see Fig. 331).

Fig. 227.—CONGENITAL SYPHILIS OF HUMERUS AND ULNA. (See Fig. 51)

The humerus and the ulna are the seat of fusiform swellings consisting of lamellae of bone arranged parallel to the surface; in the humerus these are particularly clear.

Fig. 228.—OS VESALII. (See Fig. 26)

A separate centre of ossification is often present in the projecting base of the fifth metatarsal, and must not be interpreted as a fracture.

Fig. 229.—OSTEOMA OF METACARPAL. (See Fig. 6)

Radiograph.—A large round mass of normal-looking bone is manifest projecting from the fifth metacarpal, which is much thickened. It is causing absorption and inflammation of the ring-finger metacarpal.

Fig. 230.—TUBERCULOUS PERIOSTITIS. (See Fig. 57)

There was pain on waking and swelling of the little finger

Radiograph.—A rarefied area of bone just behind the epiphysis suggests a tuberculous focus. Surrounding the original bone is a dense casing of new bone.

MR COUPLAND.

Fig. 231.—PERIOSTITIS OF METATARSAL. (See Fig. 57)

Radiograph.—Masses of irregular bone of new formation are seen at the proximal and distal ends of the third metatarsal



Fig. 232.—TERTIARY SYPHILIS. (See Fig. 16)

Radiograph.—The humerus is greatly expanded, due to new bone development from the periosteum, the least affected part being that of the articulation. The radius and ulna are but little involved.

Late Dr BIBBY

Fig. 233.—TERTIARY SYPHILIS. (See Fig. 17)

Radiograph.—Save that all three bones are affected the condition resembles Fig. 232. The humero-ulnar joint is but little involved, but the erosion of half the head of the radius has permitted it to become dislocated forwards.

N.B.—Cases such as Figs. 232 and 233 are becoming almost museum specimens; apart from the efficiency of modern treatment, syphilis appears to be losing its sting.

Fig. 234.—CONGENITAL SYPHILIS OF ULNA. (See Fig. 52)

Clinical History.—Fusiform swellings were present on the ulnæ, femora and tibiæ of a girl aged 11. Other signs of syphilis were present, and the Wassermann reaction was positive. A fullness is apparent over the site of the disease.

Radiograph.—The ulna is the seat of a fusiform swelling. Extending for two inches from the lower joint is a layer of bone; separated from the shaft by a clear space occupied by granulation tissue is new periosteal bone.

Late Dr TELING



232



233



234

Fig. 235.—CHRONIC OSTEOMYELITIS. (See Fig 54)

Radiograph.—An acute infection has originated in the epiphyseal line and has travelled up into the marrow posteriorly, as seen by absence of cortex and the relatively radiolucent marrow which extends upwards for fully three inches, where it tapers off. A large sequestrum is seen in the marrow. Around the original shaft there is an enormous development of periosteal new bone, the involucrum, which extends beyond the radiolucent marrow.

Late Mr DAW.

Fig. 236.—CHRONIC OSTEOMYELITIS

No notes.

Radiograph.—The fibula has been replaced by an irregular mass of periosteal new bone, the involucrum. Part of the original shaft is seen as a sequestrum.

N.B.—It is rare for this bone to be affected alone.

Figs. 237 and 238.—ACUTE OSTEOMYELITIS. (See Fig 49)

Clinical History.—This boy, aged five, was admitted with pain, flexion and swelling of the left knee of three days' standing; temperature 103, pulse 130. No joint effusion was present.

Radiograph.—Fig 237 (A.P.).—Encircling the femur from a point two inches on the internal and one inch on the external sides of the bone above the knee joint is plastered a mass of periosteal bone which fades away gradually above. The diaphysis beneath this bone is mottled, evidence of bone destruction.

Radiograph—Fig 238 (Lateral).—Periosteal bone is in evidence, especially in front, where is an area of irregularity in which the periosteum has been ruptured. There is a suggestion of a sequestrum.

After-History—The case was treated conservatively with plaster and sulphathiazol. A small sequestrum formed.

Late F. H. FRIER

Mr J. O. HARRISON.



FIG 237

FIG 238

Fig. 239.—ACUTE OSTEOMYELITIS OF TIBIA. (See Fig. 44)

Radiograph.—This is a difficult skiagram to interpret. There is a very thick involucrum, which extends over the whole diaphysis. There are several pale areas with central narrow, dark shadows, suggesting suppurating cavities enclosing small sequestra. which, from their shape and, in some cases, from their position, are clearly portions of the compact tissue. Had a large portion of the shaft of the tibia necrosed, there would evidently have been time enough for a definite line of separation to show itself.

Late Mr THOMPSON

Fig. 240.—CHRONIC OSTEOMYELITIS. (See Fig. 48)

Clinical History.—The boy, aged 10, was attacked by acute osteomyelitis of the humerus three weeks after operation on his femur for the same condition. The arm became swollen and painful on movement. Pus was encountered under the periosteum.

Radiograph.—The epiphyseal line is completely disorganised. On the inner side pus and granulation tissue have stripped the periosteum off the shaft, the former has proceeded to lay down fresh bone, forming the involucrum. This is apparent on the outer side, but to a less degree. Within the involucrum is a large sequestium, originally the shaft

Late Mr RICHARDSON



239



240

Fig. 241.—ABSCCESS OF RADIUS: FOREIGN BODY. (See Fig. 19)

Radiograph.—A piece of shrapnel is seen lying within an abscess cavity at the lower end of the radius, which bone has been the seat of a fracture, as shown by the angulation and the fact that the ulnar and radial styloid processes are at the same level. All bones are rarefied as a result of disuse.

Fig. 242.—TUBERCULOUS ABSCESS. (See Fig. 52)

Radiograph.—The disease, having started in the juxta-epiphyseal line, has tracked upwards into the radius, forming a bilocular abscess. The bone in the immediate vicinity is sclerosed, but rarefied beyond.

Fig. 243 —BRODIE'S ABSCESS OF TIBIA. (See Fig. 66)

A girl, aged 7, had complained of pain in the ankle for some days. An examination showed the foot in the position of equinus, swollen and hot just above the ankle joint.

Silhouette.—Note the swelling over the internal malleolus.

Radiograph.—The epiphyseal line is grossly irregular, especially on its outer side, from whence an abscess has developed involving the tibia. On the inner side of this bone and related to the abscess is a layer of new periosteal bone separated by a radiolucent line of granulation tissue.

Late Mr. DONSON

Fig. 244.—ABSCCESS OF TIBIA (See Fig. 23)

Two perforations of the tibia and a wide gap in the bone are present. No notes were available. The gap may have resulted from the scraping out of a myeloma or of a Brodie's abscess.

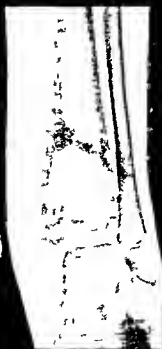
241



242



243



244



Fig. 245.—ABSCESS OF TIBIA. (See Fig. 55)

Radiograph—An oval area of radiolucency, almost the width of the tibia, is apparent, in it are two small sequestra. The bone above and below is condensed, arising at the epiphyseal line, it now lies 2 inches above it, due to tibial growth.

N B—The infection, a mild one such as obtains in pneumonia, typhoid, or tuberculous disease, probably started as a Brodie's abscess at the juxta-epiphyseal line.

Fig. 246.—EPIPHYSITIS: TROCHANTER. (See Fig. 58)

Clinical History.—A boy, aged 8, with a six-month history of injury, giving rise to a limp, complained of pain in the buttock. Examination revealed a fairly tense, deeply situated, fluctuating lump in the right gluteal region. There was limitation of all movements and fixed flexion of ten degrees. No shortening or wasting.

Radiograph—The epiphysis of the great trochanter has almost disappeared. The femur and, to a less extent, the pelvis show decalcification; the hip-joint is unaffected.

Treatment—Through a curved incision over the great trochanter an abscess was found deep to the gluteus medius, extending backwards and downwards. The joint was not involved. A month later the patient was walking well. Six months after operation he could play games, but there was a twenty-degrees limitation of flexion, probably due to scar tissue.

Note—This case gave a clinical history almost diagnostic of hip-joint disease, its true nature being recognised only by X-rays. The importance of the radiograph lay in determining the operation required, an opening in the hip-joint undoubtedly would have resulted in infection of the joint, with a grave prognosis.

Royal National Orthopædic Hospital

Late Mr J. B. BARNETT

Fig. 247.—ATROPHY OF BONES OF LEG AND FOOT. (See Fig. 65)

Silhouette—Note the swelling of the ankle region and the marked equinus position of the foot.

Radiograph—The bones, apart from their contours, are almost radiolucent. No notes were available, but the appearance suggests infantile paralysis.

Dr L. A. ROWDEN

Fig. 248.—OSTEOMYELITIS. (See Fig. 54)

Radiograph—This represents an intermediate stage between Fig. 235 and Fig. 251. The diaphysis is rarefied and necrotic, and the involucrum is enveloping it incompletely. A sequestrum of compact bone is seen along the inner border. There is no distinct space between the involucrum and shaft, so that it will be some time before the latter is set free, by which time it will be much smaller.



FIG 245



FIG 246



FIG 247



FIG 248

Fig. 249.—PAGET'S QUIET NECROSIS (See Fig 63)

Clinical History—A boy, aged 12, admitted for pain in the left knee, which, being thought to be rheumatic, was treated by extension on a Thomas's splint. He left hospital ten days later apparently well, but had to return in a week's time. The limb was put up in plaster, but it became so painful that this was removed and the limb X-rayed. The femur was found to have lost the characteristic graining, and along its margins, in the neighbourhood of the epiphysis, a layer of periosteal new bone was apparent, thought to be sarcomatous.

Operation—An exploratory incision was made and what appeared to be sarcomatous tissue was encountered, some being removed for biopsy. Amputation had been refused. The pathological report showed the condition not to be sarcomatous.

Radiograph (some time later)—This shows a small sequestrum formed as the result of the inflammatory mischief.

Subsequent History—The limb was put up in plaster and the boy made an uneventful recovery, and was well eighteen months after the onset.

N B—This condition, together with some illustrative cases, is very clearly dealt with by R. Lawford Knaggs in his *Inflammatory and Toxic Diseases of Bone*, p 42, under the title "Serous Periostitis and Osteomyelitis."

Mr E. A. BULLMORE

Fig. 250.—SCHLATTER'S DISEASE (See Fig. 64)

Clinical History—Same case as Fig 239

Radiograph—Note the fragmentation of the ossification of the spine of the tibia.

N B.—This condition is also one of serous periostitis.

Mr E. A. BULLMORE

Fig. 251.—SOME END RESULTS OF OSTEOMYELITIS: IN THE TIBIA. (See Fig 44)

A child, aged 5, had an acute osteomyelitis, which was operated upon. Several subsequent operations of the nature of sequestrotomies were done.

The tibia has stalactite-like processes of bone projecting from its surface. The disease is at a standstill, as the margins of the bone are smooth. These processes will undergo disuse-atrophy ultimately.

Fig. 252.—SOME END RESULTS OF OSTEOMYELITIS: IN THE ULNA.

(See Figs 16 and 20)

Clinical History—This was the condition present after forty-five years in a woman of 58 who had been operated upon for "inflammation of the arm." The arm had been functionally very useful and she came now in consequence of a fall.

The forearm was considerably shortened, and bent in a direction opposite to the deformity of a congenital absence of the radius (see Fig 84). This bending is due mainly to unbalanced action of muscles, but in some degree also to the tissues on the unsupported side being unable to keep pace with those on the supported side during growth.

Radiograph—The distal half of the ulna is absent save for a filament of bone, the lower end of which is slightly expanded to articulate with the carpus. The radius is bent to accommodate the ulna, its head is mushroomed on its outer side.

N B—This shows the disastrous result of premature removal of the diaphysis, before the periosteum and the necrosed shaft can regenerate fresh bone.



FIG 249



FIG 250



FIG 251



FIG 252

Fig. 253.—KÜMMEL'S DISEASE. (See Fig. 28)

Clinical History —A woman, aged 33, had a fall down a six-foot flight of stairs; for a day or two there was some stiffness. Eleven years later, when she had tingling of the fingers of the right hand and a return of the pain and tenderness in the neck, she was admitted to the Royal Victoria and West Hants Hospital.

Radiograph.—Taken eleven years after her accident it shows some wedging of the sixth and seventh vertebræ. (Another radiograph taken one year later showed no alteration in the calcification.)

Treatment.—The neck was immobilised for five weeks in hospital, after which a poroplastic collar was fitted. All symptoms rapidly cleared up. (See *B.M.J.*, 18th January 1930)

Dr MALPAS

Dr S WATSON SMITH

Note (by late D. M. Grieg, Conservator, Surgeons' Hall, Edinburgh) — The underlying pathology of Kummel's disease is "a decalcification as the result of local hyperæmia due to local post-traumatic disturbance of the autonomie nerves controlling the tone of the arterioles and capillaries, The nerve disturbance seems to result from traumatic local liberation of histamine and acetylcholine."





FIG 253

Fig. 254.—CHRONIC OSTEOMYELITIS AND PERIOSTITIS OF HUMERUS
(See Fig 15)

Clinical History.—A woman of 47 complained of excruciating pain and stiffness of the shoulder during the previous few months. Examination was difficult owing to the pain; little movement was obtained. Note the wasting of the deltoid muscle.

Radiograph.—At its upper part the humerus is thicker than normal and presents a well-marked internal ridge; it is less dense than usual. The lower part of the bone is thin and atrophic. Two rarefied areas are present in the surgical neck, the inner one possibly containing a sequestrum. There is considerable periostitis internally. The glenoid fossa is lacking in distinctness, and the adjoining part of the scapula has lost its texture possibly from ankylosis. The head of the humerus and tips of the acromion and clavicle are deficient in calcium; below, the humerus is atrophied.

N.B.—The cause may have been tuberculosis, or more likely a Brodie's abscess.

Late Mr Dobson

Fig. 255 —TUBERCULOUS RADIUS

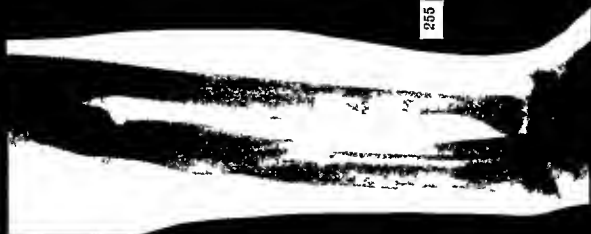
Clinical History.—The patient, aged 14, had multiple typical sinuses in the forearm, which were adherent to the bone, and discharged freely a thin yellowish pus. The scrapings were the typical grey granulations of tubercle.

Radiograph.—The outer border of the radius is somewhat sinuous whilst the inner is grossly irregular, exhibiting a bay in its middle two-fifths, in which position is a long sequestrum. Another sequestrum lies parallel to the ulna above the bay.

Late Mr BRAITHWAITE

255

255



254



Fig. 256.—ARRESTED TUBERCULOUS SPINE: BONE GRAFTS. (See Fig. 30)

Clinical History—This woman, aged 26, was an old case of congenital dislocation of the hip. In March 1947 backache of an increasing character developed, X-rays revealed tuberculous disease of the second and third lumbar vertebrae. She was nursed on a plaster-bed for 21 months. All symptoms disappeared a bone-graft operation was performed.

Radiograph—The second lumbar vertebra is the seat of dissolution behind and below, similar but less severe damage has occurred with the third, small sequestra are apparent. The remainder of these bodies are well calcified, showing arrest of disease. The disc between L 2 and L 3 has disappeared and the bones are well on their way to ankylosis. The normal lumbar curve is lost. A bone graft extends over the lower dorsal to the fourth lumbar vertebral spinous processes.

After-History—She was sent home on a plaster-bed on 23rd February 1947, and on 1st March 1947 she was sufficiently recovered to be allowed to be free in bed; she is to have a Thomas's support.

F. TOLLEY.

Dr H B HODSON.

Fig. 257.—SPINAL TUBERCULOSIS

The disease started eight years ago.

Radiograph—The third and fourth lumbar bodies have completely fused. Their clear outline and internal structure prove that the disease is quiescent.

Dr O. L. RHYE.

Fig. 258.—SPINAL TUBERCULOSIS

Clinically—A woman aged 24 had an attack of "lumbago" two years previously, which lasted a month, another attack followed a year later since when she has had stiffness, which on admission was increasing, accompanied by weakness.

Radiograph—The first lumbar vertebra has collapsed and condensed and the twelfth dorsal shows erosion anteriorly.

Treatment—The patient was nursed on her face with hyper-extension. Symptoms of compression of the spinal cord ensued, and five months after admission a large dorsal abscess was aspirated. The patient was kept hyper-extended on a plaster-bed for nine months when a spinal support was fitted (Ernst). Exercises were then instituted. Later a small tibial graft was inserted into the spines of D.12 and L.1. Three months later function was excellent, and six months after discharge she walked fifteen miles at a stretch.

Note—Very slight angulation is seen in the radiograph, as is usual when only one vertebra collapses.

Royal National Orthopaedic Hospital

Late Mr J B BARNETT.

Fig. 259.—SPINAL TUBERCULOSIS. (Fig. 30)

Clinical History—A woman, 56 years old, was admitted to hospital suffering from spastic paraplegia on 27th February 1937 when tuberculosis of the ninth dorsal vertebra was diagnosed. Two months later this vertebra collapsed and the disease spread to vertebrae above and below. She was nursed on a plaster-bed, with such satisfactory results that she was able to go home wearing a Jones' long spinal brace the spine having consolidated and spasticity gone. Under supervision she kept well until 21st March 1947, when she complained of some pain in legs and hips. Knee and ankle jerks were increased, but there was no sign of return of the disease.

Radiograph—Marked condensation is apparent in the region D 8, 9, and 10. The 9th disc has disappeared and the 8th and 10th are going the same way. Ankylosis is about to occur.

N.B.—This is a case of plastic periostitis of the vertebrae causing secondary dissolution of the discs. Compression of the cord is unusual these days—it is due to granulations rather than by bone itself.

F. TOLLEY.

Dr H B HODSON.



Fig 259



Fig 258



Fig 257



Fig 256

Fig. 260.—SYPHILITIC PERIOSTITIS OF TIBIA

Radiograph.—Observe the fusiform layer of bone of slight density, one-third of an inch thick in the middle, fading away above and below, plastered on the tibia

Dr WATSON

Fig. 261.—SYPHILITIC PERIOSTITIS OF ULNA (See Fig 50)

The whole bone, save its lower extremity, is greatly increased in density. Scattered throughout are areas of comparative transparency, giving it a mottled appearance. The humerus also is slightly affected.

Fig. 262.—SYPHILITIC PERIOSTITIS OF TIBIA. (See Fig 65)

Clinical History.—The patient, a boy of 19, sought advice for an ulcer over the tibia. The ulcer was adherent to the bone, and was thought to be tuberculous, but it promptly disappeared under anti-syphilitic treatment.

Silhouette.—Notice the swelling over the diseased bone

Radiograph.—The depression on the surface of the new periosteal deposit suggests that the periostitis was secondary to the ulcer.

Dr VIALR

Fig. 263.—TYPHOID ABSCESS OF TIBIA. (See Fig 65)

The patient, a girl aged 17, had a severe attack of typhoid fever four years before. During convalescence she began to have "boring pains" in the tibia, and swelling and redness over it, with periodic exacerbations. Examination revealed a hot fluctuating swelling over the tibia

Silhouette.—Observe swelling on the tibia

Radiograph —A fusiform node is present on the tibia; at the thickest part is a point of rarefaction due to abscess formation

N B —The condition in some ways mimics the syphilitic (Fig 258). The tibia and spine are the commonest sites for these metastatic abscesses in typhoid fever.

Mr COUPLAND



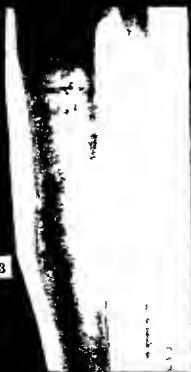
260



261



262



263

Fig. 264.—SPONDYLITIS DEFORMANS. (See Fig 28)

Radiograph.—This radiograph exhibits two well-marked forms of the disease. Firstly, the depth of the intervertebral discs is reduced; this, if unequal in distribution, leads to deformity. Secondly, well-marked ossification is revealed in the anterior common ligament and in the ligaments related to the articular processes.

Dr R W A SALMOND.

Fig. 265.—SCOLIOSIS

Radiograph—The lumbar spine shows a marked curvature, with its convexity to the left. There is no evidence of disease in the vertebræ

N.B.—The tilting of the pelvis is due to inequality of the length of the lower limbs from many diseases, and to affections of the hip-joint which cause adduction or abduction of the limb; thus the parallelism of the limbs is maintained.

Dr L A ROWDEN.

Fig. 266.—RHEUMATIC FEVER. (See Fig 54)

Radiograph.—The knee-joint is totally disorganised. The femoral epiphysis is separated from the diaphysis, the line being grossly irregular, the tibial epiphysis has been subluxated forwards. All bones are markedly deficient in lime. The epiphyses are grossly expanded.

Dr R. W A SALMOND

Fig. 267.—CALCIFIED SPINAL ABSCESS

Radiograph.—In close proximity to the third lumbar vertebra is a minute area of calcification, whilst close to the fourth is an irregular calcified mass. The vertebræ appear normal, the disease being higher up the column.

Dr L A. ROWDEN



FIG 264



FIG 265

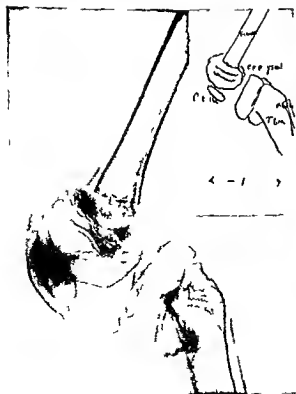


FIG 266

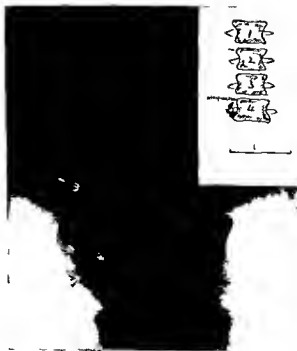


FIG 267

Fig. 268.—KYPHOSIS. (See Fig 68)

Clinical History—The man, aged 20, sought advice for stooping; there was no pain or other symptoms.

Radiograph.—The spine is markedly kyphotic. due to collapse of the anterior parts of the vertebrae. The edges of the bodies are very irregular. fluffy. and denser than the central portions. The middle vertebrae are distinctly wedge-shaped, with the thin part forward; all are deficient in lime salts

Nottingham General Hospital



FIG 268

Figs. 269-272.—RICKETS: EFFECT OF ULTRA-VIOLET RAYS. (See Figs. 40 and 41)

Clinical.—A breast-fed, well-nourished girl, aged 3, was admitted on account of bow-legs and a waddling gait. There was a marked rosary, thickening of the wrists and curvature of both tibiæ

Figs. 269 and 270.—Forearm and knee. Note the gross irregularity of the epiphyseal lines and their great width.

Figs. 271 and 272.—Same after $4\frac{1}{2}$ months of ultra-violet-ray treatment. There is a marked improvement in the lines.

After-History.—After 102 exposures, extending over 13 months and totalling 1057 minutes, she showed enormous improvement, but the epiphyses were not quite normal.

Dr C COHEN

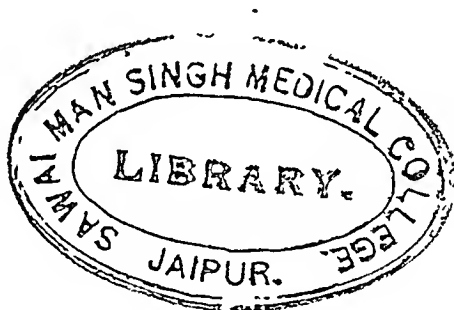




FIG 269



FIG 271



FIG 270



FIG 272

Fig. 273 — RICKETS: CURED. (See Fig 44)

Silhouette.—A straightforward case of rachitic genu valgum. Note the crossing of the two legs at the knee, and the separation of the two thighs.

Radiograph.—The femora show characteristic rarefaction above the epiphyseal line, where the deformity has occurred. The internal condyle appears elongated, owing to the depth of the epiphysis

The disease is cured, as evidenced by the sharply defined epiphyseal lines. At the attachment of the internal lateral ligament to the right tibia is a spur directed downward, this is a frequent finding in rickets

Late Mr S DAW

Fig. 274 — RICKETS OF TIBIA AND FIBULA. (See Fig 45)

Silhouette.—The legs show the well-known anterior curve of rickets, due to bending of the bone, and not to new bone formation as in syphilis

Radiograph.—Above the epiphysis the bone is rarefied as in Fig 273. The regular epiphyseal lines point to the condition being quiescent

Dr VINING

Fig. 275.—RICKETS OF RADIUS AND ULNA. (See Fig 40)

The forearm and hand of a child, aged $2\frac{1}{2}$, the subject of active rickets. The epiphyseal lines are greatly expanded and hazy, their usual sharp outlines having disappeared. Crawling has been permitted, shown by bending of the bones.

To avoid a mistaken diagnosis of early tuberculosis in such a condition is often difficult.

Dr VINING

273



274



275



Fig. 276.—TRAUMATIC SCOLIOSIS. (See Fig. 29)

Clinically.—Following an accident, a woman, aged 48, had progressive curvature of the spine for twenty years. During the last three years she had slight weakness and shooting pains in her leg; one year later she had another accident, after which the curvature became greater; she had backache and was easily tired. She had no dorsal spasm, cough, abscess or signs of spinal compression.

Radiograph.—The lumbar spine is rotated so as to appear as in a lateral picture.

Treatment.—Extension with a pillow under the kyphosis was instituted. Two months later an attempt was made to place a tibial graft on the concave side, but it was unsuccessful owing to the enormous mass of bone and its depth. so Hibb's operation on the first to the fourth lumbar spines was done, a tibial graft being placed on the convexity.

After-History.—Active exercises on a plaster bed were started. One year later she was able to walk five miles at a stretch.

Note.—Whilst this closely resembles Kummel's disease, it differs from the classic type in that there is scoliosis.

Royal National Orthopædic Hospital.

Late Mr J. B. BARNETT

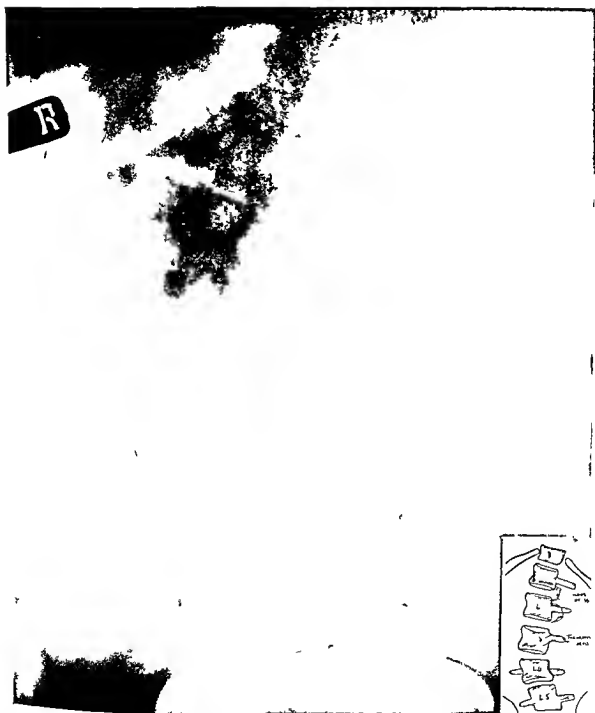


FIG 276

Fig. 277.—**HALLUX VALGUS.** (See Fig. 26)

Silhouette.—Notice the prominence on the inner border of the foot on which the bursa, commonly known as a bunion, develops. The great toe is directed outwards, thus crossing the second toe.

Radiograph.—There is no sign of arthritis or bone disease. The external sesamoid is displaced outwards.

A P.B., *Brit. Jour. Surg.* January 1923.

Fig. 278.—**PES CAVUS.** (See Fig. 26)

Silhouette.—The foot shows a concavity on its inner side.

Radiograph.—The metacarpus is arched, shortening the whole foot, the sesamoid bones are displaced outwards.

Fig. 279.—**PES PLANUS.** (See Fig. 24)

The arch of the foot is entirely gone.

Radiograph.—The os calcis is lying horizontally, its tubercle resting on the sole, probably causing pain. Sometimes a well-marked spur occurs in this situation, necessitating removal.

Fig. 280.—**PARTIAL SEPARATION OF THE TIBIAL EPIPHYSIS.**
(See Fig. 64)

Occurred in a girl, aged 14, as the result of a wrench. The tubercle of the tibia became painful on extending the limb, or on being touched.

Radiograph.—The part of the epiphysis forming the tibial tubercle is torn upwards, thus accounting for the pain on extension.

After-History.—The case was successfully treated with a back splint.

Late Mr DOBSON



277



278



279



280

Fig. 281.—FRAGILITAS OSSIUM. (See Fig 32)

Clinical History.—The femur had been broken nine times.

Radiograph —The whole bone is bent outwards; it shows a recent fracture with some overlapping. The curvature of the bone may have been due to softening or to the repeated fractures. If the former, there is a possibility of fibrocystic disease; if the latter, it would appear to be a case of tabes, in which disease there is apparently nothing to be noted save undue liability to fracture.

Fig. 282.—CYST OF FEMUR. (See Fig 64)

Clinical History.—A girl, aged 19, suffered a spontaneous fracture of the femur.

Radiograph.—For some two inches above the epiphysis the femur is rarefied, then comes a cyst about an inch in diameter. above this is a fracture with considerable angulation. It is curious that the fracture should not have taken place through the cyst itself.

Operation —The cyst together with a small portion of femur above and below were resected; bone-grafting successfully completed the operation

Late Mr J F DONSON

Fig. 283.—CYST OF NECK OF FEMUR. (See Fig 58)

Clinical History.—A boy of 7 complained first of pain in the hip; flexion was limited to ninety degrees, the other movements being normal. A hip splint was ordered.

Radiograph.—Four months later a cyst was apparent. There was no muscular wasting. A sharply limited cavity is present in the neck of the femur, with somewhat dense walls, but not nearly so dense as those of an abscess (see Fig. 242).

Operation —A thin-walled shell was broken into, exposing a cavity lined with granulation tissue. This was scraped and "bipped"

The history and appearance strongly suggest tubercle, but the microscope confirmed the diagnosis of cyst.

Late Mr DAW.



281



282



283

Fig. 284.—OSTEOGENESIS IMPERFECTA. (See Fig 33)

Radiograph.—Both femora have been the seat of multiple fractures which have healed, leaving thickenings and condensations of the shafts. The tibiae have also been broken but effective repair was readily accomplished. All bones show alternate bands of rarefaction and sclerosis.

Dr R W A SALMOND

Fig. 285.—LEONTIASIS OSSIUM. (See Fig 13)

Radiograph.—The palate and alveolar margins of the maxilla are grossly thickened, there are several unerupted teeth in the maxilla. The bone is of light texture, that of the face is hazy and radiolucent, the nasal bone is just visible. The cranial wall is somewhat thickened and the pituitary fossa rather larger than normal. The lower jaw is edentulous and has a distinctly acromegalic appearance.

Dr W H ROWDEN.

N.B.—For a full account of this rare disease see R. Lawford Knaggs' *Inflammatory and Toxic Diseases of Bone*, p. 300. There are points in this case which suggest acromegaly.

Fig. 286.—OSTEITIS MAXILLA AND MANDIBLE. (See Fig 13)

Radiograph.—The mandible is fuzzy and the maxilla even more so. There is extensive pyorrhœa and absorption of the roots of the teeth. The rest of the bones of the face are indistinct and blurred, in this way contrasting with the sharp outline of the cranial bones. This may be an early stage of leontiasis ossium.

Dr W H ROWDEN



FIG 284



FIG 285



FIG 286

Fig. 287.—SPINAL TUBERCULOSIS (See Fig 29)

Radiograph—An intervertebral disc is seen at the extreme top of the picture, the next is the first lumbar, between these is a conglomerate mass of bone and calcified material from which project the transverse processes

F TOILEY

Dr H B HODSON

Fig. 288.—PAGET'S DISEASE OF SKULL. (See Fig 12)

Clinical History—A woman, aged 56, with generalised osteitis deformans

Radiograph—Note the curious woolly nature of the deposit laid down in the skull, best seen along the vertex. The marked mottling present is due to the different stages in the disease, where the condition is of long standing the bone is sclerosed, where the disease is of recent origin it is of diminished density, perhaps slightly porous, due to vascularisation.

Nottingham General Hospital

Fig. 289.—PAGET'S DISEASE OF SPINE

Same case as Fig 288

Radiograph—The space normally occupied by the intervertebral discs is greatly reduced in depth in the lumbar region, and has altogether disappeared in the dorsal region. The lumbar transverse processes have curious double contours due to new deposit of bone

Nottingham General Hospital

Fig. 290.—VARICOSE ULCER: BONE CHANGES OF

Clinical History—A woman, aged 72, had a "white leg" on the right side, unconnected with childbirth, she sprained her ankle sixteen years later and since then the leg has never felt comfortable. Seven years ago, as the result of a knock, an ulcer developed which has never healed in spite of many forms of treatment. It now encircles the leg save for two inches in front. She is in constant pain, boring in character, worse at night. She refused amputation. Wassermann reaction negative. Varicose eczema is present in the left leg.

Radiograph—Silhouette—The ulcer site is indicated by two black lines, the girth of the leg in the region of the ulcer is reduced. Comparison of the two tibiae shows the right to be considerably increased in thickness. Just above the internal malleolus is a plaque of dense new bone which fades away as it is traced upwards, some new bone is apparent on its outer surface. Except below the ulcer there is no trace of medulla visible, owing to increased depth of cortex. The fibula is thickened in the region of the ulcer, above which it is normal. A calcified phlebolith is seen three inches above the right external malleolus and several smaller ones on the left side.

N B—The appearances accord with those seen in sections of tibiae in the R.C.S. Museum, Hunterian Collection. In these days of elastoplast and viscopaste such ulcers are becoming increasingly rare.

Mr A P BERTWISTLE

Dr H L GROOM, *Lancet*, 30th June 1943



FIG 287



FIG 289

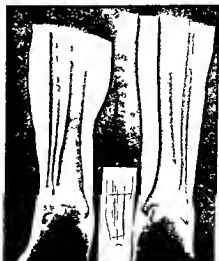


Fig. 291.—OSTEITIS DEFORMANS, EARLY: SPONTANEOUS FRACTURE

Clinical History.—A woman, aged 80, had noticed her leg altering in shape for a year or so. She stumbled and felt a severe pain in her leg, which did not prevent her limping upstairs to bed. Examination revealed the typical bending of the tibia associated with the name of Paget, also a painful point over the summit of the bend. She refused to have it X-rayed until three weeks later, when the pain had not diminished as much as she had hoped.

Radiograph.—The tibia shows the characteristic radiolucency of early Paget's disease, when the bone is extremely vascular. There is a fracture at the point of greatest curvature. Callus is present. Compare the density with that of Fig. 292 which is a late stage of the disease.

Treatment.—Grooved aluminium splints were applied, they were removed twice weekly for massage. In spite of all advice the patient insisted on getting about and generally doing what is considered bad for fractures. Despite this in four months she was able to walk without support. There was some advance in the disease. Subsequently she broke her leg twice, once when hurrying for an omnibus.

Mr W. B. R. MONTEITH

Mr A. P. BRETWISTLE

Fig. 292.—OSTEITIS DEFORMANS OF TIBIA (LATE)

Clinical History.—The patient, aged 58, fractured his tibia whilst playing football when 38, since which time his leg had been gradually bending forwards. He had no symptoms save a sense of weakness in the limb when tired, until three months previously, when he experienced severe pain, especially at night. No other bone was affected. The family history was good, and the Wassermann reaction negative.

Silhouette.—Note the characteristic long anterior curve of the leg.

Radiograph.—The fibula is normal and the bending of the tibia enables it to maintain its articulations with that bone. This is easily effected as the bone later dense to the rays, is very soft and malleable at first. Observe the slight difference in density between the compact bone and the medulla, and the great increase in thickness of the former. Contrast this with syphilitic periostitis (Fig. 260) and rachitic curves (Fig. 274).

Mr COUPLAND

Fig. 293.—OSTEITIS DEFORMANS: FRACTURES

Clinical History.—A man, aged 72, had had his prostate removed three years before this radiograph was taken, it was pronounced non-malignant. The leg had been broken many years previously, latterly there had developed considerable deformity, with some pain on weight-bearing.

Radiograph.—In the lower third of the leg two partial fractures are seen another is seen at the junction of upper third with lower two-thirds which has almost healed though some callus is still present posteriorly. The distinction between marrow and cortex is lost above and is ill defined below. The softened bone has bent to accommodate itself to the normal fibula and muscles.

F. TOLLEY

Mr J. LEWIS



FIG 291



FIG 292

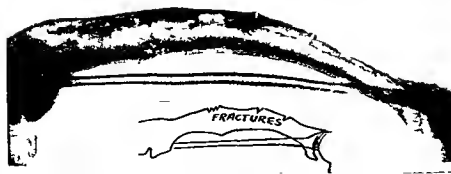


Fig. 294.—SPONDYLITIS DEFORMANS

Radiograph.—The anterior common ligament has ossified, obscuring the upper intervertebral discs and causing the lower ones to almost disappear, curiously enough leaving intact the ninth dorsal disc.

Nottingham General Hospital

Fig. 295.—SPONDYLITIS OSTEO-ARTHRITICA

Clinical History.—This occurred in a woman who had Argyll-Robertson pupils, absent knee jerks, but a negative Wassermann reaction

Radiograph.—The first lumbar vertebra is slightly deformed, the second and third are grossly distorted, whilst the last two are almost unrecognisable. There is marked lippling and atrophy, which have led to lateral displacement

It is quite possible that this is the special form of osteo-arthritis known as Chareot's, as Dr J. M. Brailsford suggests.

Nottingham General Hospital

Fig. 296.—SPONDYLITIS DEFORMANS. (See Fig. 30)

Clinical History.—A man, aged 48, sprained his back a week ago, he gave no previous history of pain there

Radiograph.—The lumbar vertebræ are remarkably clear but the dorsal ones are as if set in a concrete-like mass of bone, through which the intervertebral discs are just visible. The anterior and posterior spinal ligaments have become ossified.

N.B.—The absence of pain can be accounted for by the normal absence of movement in this region of the column unless it was jarred

F TOLLEY

Mr J. O. HARRISON

Fig. 297.—OSTEO-ARTHRITIS SPINE. (See Fig. 30)

Radiograph—All discs from D 8 to L 2 are hazy. The lower part of L 4 is clear, L 5 is in process of fusion with the ala of the sacrum. D 8 is very dense, due to the same cause as in Fig 264, ossification of anterior common ligament. The articulations of laminae and bodies irregular: the transverse processes are hardly to be recognised. The calcium content being so small.

F TOLLEY

Dr HOLMES W

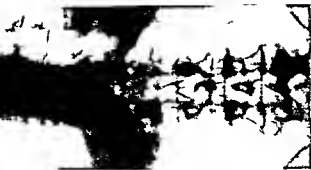


Fig 290



Fig 297



Fig 299



Fig 291

Fig. 298.—SPONDYLOLISTHESIS. (See Fig 32)

Radiograph.—In the A.P. view the fifth lumbar vertebra appears unduly prominent and very opaque owing to its superimposition on the fourth and the sacrum; its transverse processes are seen in close apposition to the alæ of the sacrum. The lateral view showed the lordosis which the condition causes.

MR THURSTAN HOLLAND

Late Sir ROBERT JOYNS

Fig. 299.—CHRONIC SYPHILITIC OSTEO-PERIOSTITIS

Radiograph.—The whole of the femur is greatly increased in bulk and, above, in density. In the upper half the medullary cavity is not visible, due to great increase in depth of the cortex.

DR W. H. ROWDEN

Fig. 300.—ACUTE OSTEOMYELITIS. (See Fig 43)

Clinical History.—Twelve months previously the boy, aged 6, had an acute attack of osteomyelitis.

Radiograph—This shows the effects of a central osteomyelitis in which sequestra are still present though rather obscured by the thickening of the bone around them. A large cloaca marked the union of the more heavily infected lower and the less infected upper parts; in the latter, two areas of periosteal inflammation are apparent.

DR W. H. ROWDEN

Fig. 301.—NECROSIS OF MANDIBLE. (See Fig 13)

Radiograph.—The jaw is hopelessly deformed as the result of new bone formation of slight density and presenting several areas of radiolucency due to sinuses, at the mouth of one of which is a probe. The dark area in the clear space is either a sequestrum or injected opaque material.

No notes were available, but the condition simulates that found in phosphorus poisoning and in scarlet fever.

Late Dr R. KNOX



FIG 298



FIG 299



FIG 300



FIG 301

Fig. 302.—OSTEITIS DEFORMANS OF ULNA. (See Fig 17)

Clinical History—The patient, aged 45, sought advice on the bending forwards of his legs. Examination showed the tibiæ to be bent, with an anterior convexity and rounded anterior borders. Both ulnæ also were bent, with a convexity inwards. The head was large but there was no history of his taking larger sizes in hats.

Radiograph.—The marked increase in the circumference of the bone is due to new bone formation of slighter density than normal. Several areas of comparative rarefaction are evident; these are very typical of the condition. The ulna has bent to retain its articulation with the radius, which bone is rarely affected.

MR COUPLAND.

Fig. 303.—OSTEOMALACIA. (See Fig 23)

Silhouette.—Note wasting of thigh.

Radiograph.—The femur is almost devoid of lime salts. Below is a fracture of recent origin; some two inches above this is a healed fracture.

Dr L. A. ROWDEN

Fig. 304.—OSTEOMALACIA. (See Fig. 6)

Same case as Fig 303.

Silhouette—Marked wasting of the musculature of the hand is present.

Radiograph—Everywhere is a deficiency of calcium. The articular spaces are very much reduced in size, suggesting that ankylosis may be about to occur. The ring metacarpal has been broken, it is being repaired but at the cost of some length, the fragments overlapping. The second and third metacarpals show local rarefaction, predisposing to fracture.

N.B.—Dr Rowden stated that it was hard to realise that there was a patient on the couch, she was so transparent. The tube, a gas one, had to be softened before shadows of the bones were cast. Maxwell has shown that the condition is due to foetal drain in a mother already poor in lime salts.

Dr L. A. ROWDEN.



FIG 302



Fig. 305.—ACHONDROPLASIA. (See Fig 33)

Radiograph.—Observe the shortness of the limbs in comparison with the trunk, the arms reach only to the level of the third lumbar vertebra—*i.e.* the umbilical level—whilst the legs are short and bent above the knee. The diaphyses are stout and short, whilst the ends are enormously expanded; whilst this is best seen in the case of the humera, it is present in all the bones. There is no centre of ossification in the epiphyses at the knee-joint, this may be the result of immaturity of the specimen however, which may also explain the diminutive centres of ossification in the tarsal bones. The ossification of the spine and pelvis is retarded. The skull, partly out of the picture, was large due to poor development of the basis crani.

N.B.—A still-birth is evidenced by failure of lungs to “light-up”

Late Mr R LAWRENCE KNAGGS



FIG 305

Figs. 306 and 307.—ACHONDROPLASIA. (See Fig 33)

Radiograph.—Skull—Note the large size of the vault, the shortness of the basis crani, the smallness of the face, the prominent forehead and retraction of the root of the nose. These features are dependent on the retarded growth of the cartilaginous basis crani

Am.—Observe the dwarfed and thickened character of the bones. No trace of ossification is manifest in the epiphyses. The ends of the shafts of the long bones were unduly large, the most characteristic feature of the disease.

Dr R W A SALMOND

Fig. 308.—OSTEITIS FIBROSA. (See Fig 25)

Radiograph.—The tibia is riddled with radiolucent cysts resulting from degenerative changes in the fibrous tissue laid down in the bone. Several forms of this condition exist, from those in which there is a single cyst, and others with multiple ones, to those in which the bone is replaced by masses of fibrous tissue, when the parathyroid is often responsible.

Dr R W A SALMOND

Fig. 309 —SYPHILITIC EPIPHYSITIS. (See Fig 33)

Clinical History—The disease was associated with swelling and pain on passive movement, leading to pseudo-paralysis.

Radiograph.—The epiphyseal lines of the femora and tibiæ are grossly irregular, broad, and in one place rarefied. Double contours, characteristic of syphilis, are apparent in all the bones

Dr R W. A SALMOND.

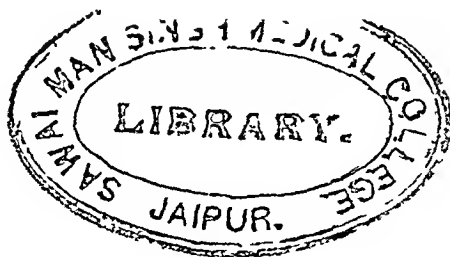




FIG 306



FIG 307



FIG 308

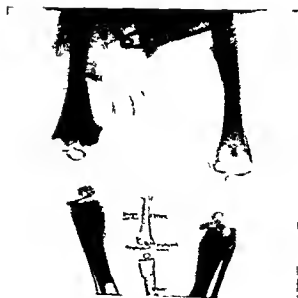


FIG 309

Fig. 310.—OSTEOMYELITIS HUMERUS. (See Fig 45)

The attack took place five months previously.

Radiograph.—The infection has started at the lower epiphyseal line and spread upwards in the medulla, to find an exit at the upper epiphyseal line, so explaining the unilateral deposit of periosteal bone internal to the head. Only the upper part of the original shaft of the humerus remains. A new bone has been built up by the periosteum which encases what remains of the old shaft. The elbow-joint has disappeared, bony trabeculae cross the site freely.

Dr W H ROWDEN.

Figs. 311 and 312.—OSTEOMYELITIS FEMUR. (See Fig 64)

Apparently a patient of about 14.

Radiographs —Fig. 311.—The femoral diaphysis is enormously thickened and dense. The mischief would appear to have started at the lower epiphysis, a favourite site. In the upper part is seen the shaft of the femur surrounded by lamellae of new, periosteal bone. The end of the diaphysis is extremely jagged, two sequestra are seen in close proximity to cloacae. The epiphyses of the femur and tibia are ghost-like, due to decalcification.

Fig 312 ($1\frac{1}{4}$ years later) —The shaft is less opaque, above, it has blended with the involucrum. The two sequestra, noted above, have become greatly reduced in size, they are one inch higher up the bone, due to growth from the lower epiphysis; they lie in well-defined cloacae, probably surrounded by pus.

Dr W H ROWDEN



FIG 310



FIG 311

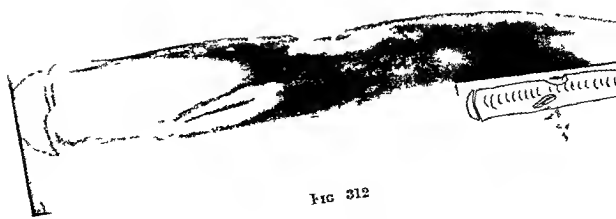


FIG 312

Figs. 313-315.—FIBROCYSTIC DISEASE, STAGES OF. (See Figs 53 and 58)

Radiographs.—Fig. 313.—At the age of 7 the neck of the femur presented a honeycombed mass of cavities, the great trochanter was also affected.

Fig. 314.—At 14, the cavities seen above have disappeared and given place to a uniform loss of density of the bone, which has predisposed to a fracture through the point of greatest projection of the shaft. The great trochanter rests on the acetabular rim, the head having slipped down the shaft.

Fig. 315.—Healing of the fracture has occurred, with comparatively little deformity; some honeycombing is visible below the point of fracture. (Radiograph accidentally printed on reverse side.)

Nottingham General Hospital

Fig. 316.—SYPHILITIC PERIOSTITIS. (See Fig. 51)

A patient of about 16 years.

Radiograph.—Wrapped round the upper end of the radius is a sheath of periosteal bone. From its position, syphilis is the most likely cause of this node. Between the new and old bone is a layer of granulation tissue, visible as a radiolucent line; this is especially obvious distally.

Dr W H ROWDEN.

R



FIG 313



FIG 314



FIG 315



FIG 316

Fig. 317.—MADELUNG'S DEFORMITY. (See Fig. 31)

Radiograph (A.P.).—There is a wide interval between the ulna and radius and the shadows of the carpal bones are superimposed on them.

Radiograph (Lateral).—The end of the ulna is displaced so far backwards that it fails to articulate with the carpus. The lower end of the radius is bent forwards.

N.B.—This is not quite a typical case, in that there is distinct evidence of trauma shown by a flake of bone torn from the radial diaphysis just above the epiphyseal line.

Mr THURSTAN HOLLAND.

LEWIS ST. ROBERT JONES.

Fig. 318.—KÖHLER'S DISEASE (EARLY). See Fig. 57

Note the fragmentary centre of ossification in the scaphoid: round this, new bone of slight density is forming. (After a year or two the bone will assume its normal size and opacity.)

N.B.—These curious aseptic inflammations of bone are dealt with in R. L. Knaggs' *The Infective and Toxic Diseases of Bones*: they include Perthe's hip and Schlatter's tubercle of the tibia.

Fig. 319.—KÖHLER'S DISEASE (LATE). See Fig. 57

Note the condensation of the scaphoid which has taken the place of fragmentation. The bone much reduced in size.

Nottingham General Hospital.

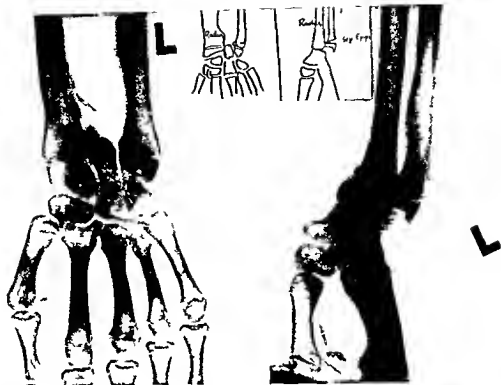


FIG 317



FIG 318



FIG 319

Fig. 320.—DIAPHYSEAL ACLASIA. (See Fig. 63)

Clinical History.—A miner of 17 complained of “lumps” about the knee. He suffered a severe sprain of the knee in the pit two years before. No splint was worn, but he was confined to the house for several weeks. Since his accident he has become somewhat “knock-kneed.”

Silhouette.—Lumps are apparent above and below the knee joint on its inner side.

Radiograph.—Projecting upwards from the femur at some distance from the epiphyseal line is a stout boss. A similar, less opaque mass arises from the inner surface of the tibia. Superimposed on the tibial shadow is that of another mass of bone. A stalactite of bone projects downwards from below the head of the fibula. The patella is displaced medially. All these processes start at the epiphyseal line; as more bone is laid down their point of attachment lies further and further from the joint.¹

Late Mr BRAITHWAITE.

Fig. 321.—EXOSTOSIS OF SCAPULA. (See Fig. 28)

An exostosis is present near the vertebral border of the scapula, about the level of the spine, no doubt growing from the epiphyseal line.

Fig. 322.—SUBUNGUAL EXOSTOSIS. (See Fig. 28)

Clinical History—This was found in a woman of 26, it had been growing for eight years. The inner half of the nail was absent, projecting through this gap was a corn-like body.

Radiograph.—A spur of bone directed upwards from the tip of the ungual phalanx is visible

Mr COUPLAND

Fig. 323.—SUBUNGUAL EXOSTOSIS. (See Fig. 26)

Occurred in a boy of 17, and had been causing trouble for nine months. It was treated, as in the last case, by removal.

A stout sessile process is apparent projecting inwards and upwards²

Late Mr BRAITHWAITE

¹ The reason for the direction of these processes away from the ligament, the pull of which caused them, has been the subject of discussion. The probable explanation is that the ligament dragging upon the bone causes a reaction. Once started, the bone grows in the direction of the parent bone—that is, away from the growing epiphysis. In the case of the knee, the commonest situation, they grow upwards from the femur, and downwards from the tibia.

After the period of growth these projections, serving no useful function, tend to undergo disuse-atrophy, but may need surgical removal. They are of frequent occurrence in rickets.

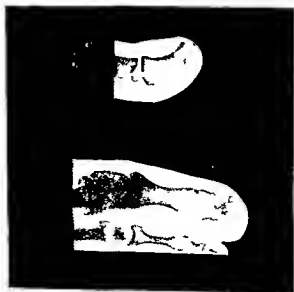
² There has been much conjecture as to the causation of these exostoses. Ingrowing toe-nail is almost confined to the great toe, as is also the subungual exostosis. May not the irritation of the former—during the period of growth—cause the latter?



FIG 320



FIG 321



FIGS 322 and 323

Fig. 324.—MYELOMA MANDIBLE. (See Fig 13)

Radiograph.—In the angle of the jaw there is a myeloma with its characteristic markings. The position, away from the alveolar margin, excludes cysts connected with the teeth.

Late Dr R KNOX

Fig 325.—IVORY EXOSTOSIS. (See Fig 14)

On the right side, and still more manifest on the left, are dense shadows in the region of the frontal sinuses, due to ivory exostoses. The sinuses themselves are somewhat opaque, due to retained secretions. One of the exostoses, on the right, has started to invade the orbit.

N.B.—Removal is frequently indicated, owing to encroachment on the eye; on account of its extreme density, this is done by chiselling away the normal bone at the base.

Dr R. W A SALMOND

Fig. 326.—OSTEOMA HUMERUS. (See Fig 39)

Radiograph—A boy, aged 5 A cancellous osteoma is seen on the inner side of the humerus. Its clear outline and graining differentiate it from malignant disease. This probably started as a cartilaginous tumour at the epiphyseal line.

Dr O L RHYS

Fig. 327.—MYELOMA. (See Fig 40)

Silhouette—Note the swelling of the forearm above the wrist

Radiograph.—A typical myeloma, in one of its favourite sites, is seen. Several trabeculae are visible on the surface of the tumour; the epiphysis, as is usual, is unaffected. Such tumours pulsate when the cortex is sufficiently absorbed

Dr L A ROWDEN



FIG 324



FIG 325

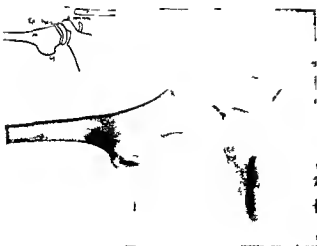


FIG 326



FIG 327

Figs. 328 and 329.—OSTEOGENIC SARCOMA

Clinical History.—This lad, aged 11, first noticed that his right thigh ached when playing football. Three months later it began to swell, becoming red and painful.

Radiograph.—Fig. 328.—The radiating spicules of bone pathognomonic of periosteal sarcoma are evident. Above the main mass of the tumour is the typical cuff of new periosteal bone, such has been mistaken for callus or inflammation. No evidence of pulmonary metastases was present.

Treatment.—A course of nineteen deep X-ray exposures resulted in improvement of general condition and gain of weight.

Radiograph.—Fig. 329.—This, taken nine months after the aching in the limb, shows numerous rounded areas of varying size of metastatic sarcoma in the lungs.

N.B.—The great importance of having a radiograph of the chest before considering amputation for this condition is obvious.

Nottingham General Hospital.

Fig. 330.—ENCHONDROMA. (See Fig. 62)

Radiograph.—The epiphyseal line of the fifth metacarpal is disrupted by a large tumour with the radiolucency of cartilage: in it are some streaks of calcification. It is displacing the fourth metacarpal.

N.B.—This is one of the few regions where the "cell-nest" theory of tumours is justified.

Dr W. H. ROWDS



FIG 328



FIG 329

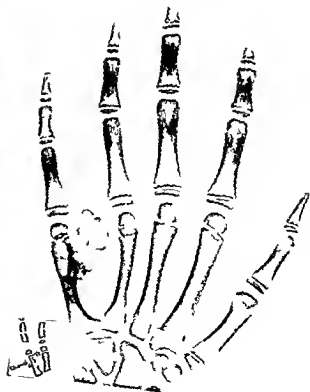


FIG 330

Fig. 331.—ENCHONDROMATA OF HAND. (See Fig. 10)

Radiograph.—The fingers show irregularities in contour due to underlying radiolucent tumours of cartilage which have greatly expanded the bone, and in places have broken through the bony shell: the radius is also affected.

Fig. 332.—CALCIFIED ENCHONDROMA. (See Fig. 6)

Silhouette.—Shows a swelling over the distal end of the middle phalanx, which is not wasted

Radiograph —A dense growth appears in the shaft of the middle phalanx the interphalangeal joints are unaffected.

Fig. 333.—ENCHONDROMA. (See Fig. 40)

Silhouette.—The wrist is grossly deformed by a large swelling, especially on its outer border.

Radiograph —The lower end of the ulna is the seat of an enormous loculated semi-radiolucent growth projecting against the radius, which would appear to be suffering from atrophy. It projects over the wrist, obscuring that joint.

Fig. 334 —ENCERONDROMA. (See Fig. 24)

Silhouette.—A lump is present over the foot

Radiograph.—Superimposed on and projecting above and below, the first metatarsal is a calcified enchondroma. The first phalanx is absent, probably removed at operation.

Fig. 335.—CHONDROMA. (See Fig. 23)

Clinical History.—A woman of 38 had felt a lump on the inner side of the knee for seven years, latterly it had become painful, even the bedclothes seemed heavy.

Radiograph —One inch below the articular surface of the tibia is a radiolucent process of cartilage. Throughout is a web of bony filaments. There is no suggestion of involvement of the tibia. The condition bears a strong resemblance to diaphyseal aclasia.

Operation.—The tumour was removed, it proved to be a chondroma.

Subsequent History —No return after three years.

Late F. H. FRIER

Mr J. LEWIN



FIG 331

FIG 332

FIG 333



FIG 334



FIG 335

Fig. 336.—ENDOSTEAL SARCOMA

The centre of the tibia is occupied by a large sarcoma presenting trabeculae not unlike those of a myeloma, from which however it is readily distinguished by its position and its invading margins. These trabeculae represent either remains of the original shaft or new bone formation as the result of irritation. The shaft above and below is condensed. Below and, especially, above is seen the well-defined cuff which is so characteristic of the periosteal form; in advanced cases it may be difficult to differentiate them, save for the point of attack.

Dr R. W. A. SALMOND.

Fig. 337.—SARCOMA. (See Fig. 48)

The arm and shoulder were greatly swollen, due to new growth and venous and lymphatic obstruction.

Radiograph.—The upper half of the humerus is the seat of a large growth of mottled consistency. It has permeated and extended beyond the periosteum externally, though the main mass is probably still bounded by a connective-tissue covering, and there is no radiographic evidence of infiltration of the deltoid; on the axillary side the shadow arrangement suggests erosion of the bone and infiltration of the muscles attached to it, therefore a periosteal sarcoma. There has been a spontaneous fracture. The epiphysis and joint are unaffected, though the head of the humerus has been lifted upwards. Limitation of movement at a joint caused by tumour is rarely due to involvement of the joint, but to the mass of the growth.

Late Dr R. KNOX.

Fig. 338.—ENDOSTEAL SARCOMA. (See Fig. 66)

Radiograph.—In this case the site of origin is probably the cancellous tissue of the lower end of the tibia rather than the periosteum, though this shows definite radiating streaks in its inner side, but no cuff. The density of the mass suggests that it is undergoing ossification from within, outwards. The appearance of the periosteum is evidence that it has penetrated the cortex, and the probe indicates the site of fungation.

Dr L. A. ROWDEN

Fig. 339.—METASTATIC MAMMARY CARCINOMA

Radiograph.—A radiolucent area of new growth interrupts the shaft of the humerus. There is a fracture across it. A fine line along the outer side shows some little attempt at periosteal new bone formation.

Dr R. W. A. SALMOND



FIG 336



FIG 337



FIG 338

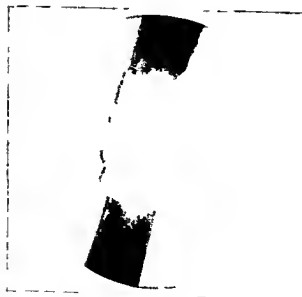


FIG 339

Fig. 340.—PERIOSTEAL SARCOMA

Radiograph.—Rays of new bone of slight density radiate from the right side of the femur, some project from the left side but these are attached behind the bone. On the left surface of the femur is a cuff of bone of light density separated from the shaft by a radiolucent line of granulation tissue.

Fig. 341.—MYELOMA OF FEMUR. (See Fig. 22)

The cancellous lower end of the femur is seen to be enlarged by a central tumour, with a defined edge above and below. The bone has been largely absorbed, but osseous trabeculae appear to ramify in the tumour mass. Above the patella the compact wall has disappeared, and the tumour is here probably covered only by periosteum. The joint is not involved.

Fig. 342.—OSTEOMA OF HUMERUS. (See Fig. 48)

Clinical History.—A youth of 15 complained of pain between the finger and thumb, which prevented his working. Examination showed a bony tumour attached to the outer side of the humerus, about its middle, which was not tender.

Radiograph.—The plate shows a nodule of new bone in the neighbourhood of the musculo-spiral nerve similar in structure to the exostoses in Fig. 326.

Contrast with the irregularity of a sarcoma (see Fig. 337).

The area of pain is difficult to interpret, unless the radial fibres of the musculo-spiral nerve were implicated

Late Mr DONSON.

Fig. 343.—PERIOSTEAL SARCOMA. (See Fig. 32)

Clinical History.—The man, aged 62, had noticed a swelling in the left side of the pelvis for two or three years.

Radiograph (P.A.)—Superimposed on the ala of the ilium is a large ossifying tumour which extends beyond the crest and outer border of the ilium.

After-History.—Treated by deep X-ray therapy, unsuccessfully. It was painless.

Late F H FRIER

Mr J. O. HARRISON.



FIG 340



FIG 341



FIG 342



FIG 343

Fig. 344.—SARCOMA OF SCAPULA (See Fig. 48)

Clinical History.—A girl, aged 13, complained of swelling of the shoulder. There was a huge mass in the region of the scapula filling up the axilla. Movement of the arm was free.

Radiograph.—The scapula is seen to be entirely replaced by a hazy mottled mass except for the tip of the acromion; the head of the humerus is intact.

Treatment.—Coley's fluid and deep X-ray therapy resulted in the disappearance of the tumour; there was no recurrence two months later

Late Lord MOYNIHAN

Fig. 345.—INTRAMEDULLARY SARCOMA OF TIBIA. (See Fig. 22)

The density of the upper part of the tibia is much reduced by the presence within it of an intramedullary sarcoma. The bone is definitely expanded; unlike the myeloma and periosteal form it is at a distance from the joint.

Fig. 346.—OSTEOMA OF RADIUS. (See Fig. 20)

An irregular mass of new bone of slight density is growing from the tuberosity of the radius. Its regular edge and its structure excluded the diagnosis of malignant disease.

Fig. 347.—MYELOMA OF HUMERUS. (See Fig. 39)

Silhouette.—The absence of muscular wasting negatived tuberculous disease.

Radiograph.—A large tumour occupies the upper end of the humerus, the trabeculae are pathenomic of the condition radiologically.



FIG 344



FIG 345



FIG 346



FIG 347

Fig. 348.—PRIMARY SARCOMA OF SKULL. (See Fig 13)

Clinical History.—An intelligent history was hard to obtain. The man, aged 57, had a “lump” about the position of the anterior fontanelle from birth. It was removed twelve years ago and found to be cystic, but it recurred almost immediately. For six months it hardened, and four months later clear fluid began to ooze from the lump.

Silhouette.—A hard irregular mass over the vertex with a suggestion of egg-shell crackling.

Radiograph.—Reveals a bony tumour intimately associated with the swelling of the scalp, having the appearance of a sclerosed boss with spicules radiating from it.

N.B.—The skull is very similar to a large specimen presented to the Royal College of Surgeons, England, by the late Mr Ward

Late Mr THOMPSON

Fig. 349.—SECONDARY SARCOMA OF SKULL. (See Fig 14)

Clinical History.—The patient, a boy of 13, had his leg amputated at the hip for periosteal sarcoma of the femur. There had been no local recurrence. A small lump appeared some twelve weeks ago on the left parietal bone, which had grown rapidly during the last four weeks. It had become intensely painful and was accompanied by incessant vomiting. The boy's mental powers were good.

Radiograph.—A prominence is evident over the left parietal bone, due to an underlying hazy deposit of new bone of a mottled character.

The swelling is due to a sarcoma, showing periosteal bone at its centre and a faint haze of calcification elsewhere.

Late Mr DOBSON



FIG 348



FIG 349

Fig. 350.—METASTATIC HYPERNEPHROMA IN FEMUR. (See Fig. 20)

Clinical History.—The patient, a woman of 49, had a history of painless hæmaturia of five years' standing. Two years previously nephrectomy had been done, when the tumour removed was said not to be a sarcoma. For two or three weeks she experienced a sense of weakness in the thigh, and a feeling as if the bone were bending, causing her to limp. Then a spontaneous fracture occurred, and she was admitted to hospital.

Radiograph.—Shows that the shaft has been absorbed for about three inches, and, connected with the gap thus made, there is an expanded globular growth, with evidence of scattered and irregular bone patches. These are chiefly the remains of the shaft, but may be, as in the case of a sarcoma, new formation; carcinoma rarely causes new bone formation.

Late Mr DAW.

Fig. 351.—METASTATIC OVARIAN CARCINOMA IN FEMUR. (See Fig. 20)

Clinical History.—The patient, aged 47, feeling in good health, and not losing weight, was found to have an inoperable carcinoma of the ovary, with secondary deposits in the peritoneum, liver, humerus and femur.

Radiograph.—The normal bony tissue of the neck especially, and the adjoining femur, is being replaced by tumour formation, the whole giving a mottled appearance. The femur has been elevated on to the dorsum ilii.

Late Mr OLDFIELD

Fig. 352.—DIAPHYSEAL ACLASIA. (See Fig. 64)

A patient aged about 20.

Radiograph.—The clue to the diagnosis of this plate lies in a small radiolucient area of cartilage apparent projecting from the lower epiphyseal line of the femur. It was at this line that the large boss of bone visible above took origin; as growth proceeds the bone comes to lie further and further from the knee.

Dr W H ROWDEN

Fig. 353.—PERIOSTEAL SARCOMA (EARLY). (See Fig. 64)

A subject of about 18 years.

Radiograph.—The cortex of the bone of the tibia close to the epiphyseal line has been eroded by a tumour. A minute flake of calcification marks the limit of the tumour peripherally. This bears some resemblance to Fig. 336

Dr W. H. ROWDEN.



FIG 330



FIG 352

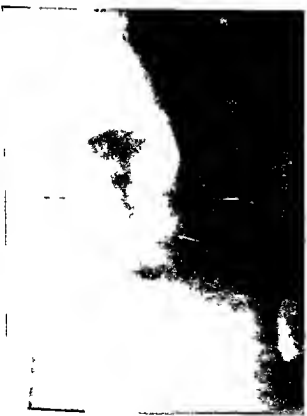


FIG 351



FIG 353

Figs. 354 and 355 —SARCOMA. ILIUM. (See Fig. 32)

Clinical History.—At the age of 30 this man complained of “sciatica” Examination revealed a swelling in the right ilium, which biopsy proved to be a sarcoma.

Fig. 354 —Radiograph.—The whole of the ilium is rarefied, the ala being radiolucent. The great trochanter of the femur is thickened and rarefied. (Printed on wrong side.)

Treatment.—Deep X-ray therapy.

Fig. 355. — Radiograph (6 months later) —The ilium and great trochanter have regained much of their normal density.

Present condition after 4 years remains satisfactory.

Late F H FRIER

Mr J LEWIN

Figs. 356-358.—CARCINOMA: METASTATIC. (See Fig. 15)

Clinical History.—A woman, aged 70, complained of severe pain in the right shoulder, forearm and hand; this pain was so acute that only a superficial examination was possible. The liver was greatly enlarged

Fig. 356.—Radiograph.—About the middle of the humerus is a rarefied area in a bone of light density. A pathological fracture is apparent at the centre of the rarefied area; no evidence of repair in the way of callus is present.

Fig 357.—Radiograph.—Similar to Fig. 356 save that an icicle of cortical bone has separated from the shaft

Fig. 358.—Radiograph.—The diaphragm has been elevated by an enlarged liver, the seat of massive deposits of carcinoma No pleural fluid is present.

Late F H. FRIER

Dr E HOLMES WATKINS



FIG 354



FIG 355



FIG 356



FIG 357



FIG 358

Fig. 359.—CHONDROMA: SPINE

Clinical History.—A youth, aged 12, experienced pain in the middle of the back after swimming: shortly afterwards a swelling appeared in the lower dorsal region, which was dubbed tuberculous on X-ray evidence. He was treated in a sanatorium where a biopsy suggested a giant-celled sarcoma. At 15 years of age the swelling extended from the 8th dorsal to the 2nd lumbar vertebræ, it was two inches above the surrounding skin. The overlying skin, soft in some places, firm in others, was somewhat tender. Almost complete paralysis of both lower limbs was present: bladder function normal. Pain was present in both legs and to a less extent in the spine.

Radiograph (age 15) —Between the 12th dorsal and lower part of the 3rd lumbar vertebra is a mass of semi-radiolucent spherical areas with sharply defined dense edges. There is right lateral displacement of the spine at the tumour, which is chiefly on the right.

Subsequent History.—The boy, now 19, has made gradual progress from spinal carriage to wheel-chair and has no pains. The swelling is smaller, firm, not tender, and has no soft areas in it. He can sit up quite well, and, although much wasted, can move both legs, the right being the weaker and showing some impairment of sensation.

N.B.—The appearance of the tumour by X-rays and the progress made suggest a chondroma, the calcification and ossification of which has led to consolidation.

Late F. H. FRIER.

Mr J. O. HARRISON.

Fig. 360.—CARCINOMA: SPINE AND SKULL. (See Fig. 28)

Clinical History.—Five years previously the woman, aged 57, had her breast amputated for a "lump" which had appeared fourteen months before. Recently she had experienced "rheumatism" in the shoulder, lately her head had "dropped forward." There was marked deformity of the lower cervical and upper dorsal vertebræ, with a concavity backwards. About this time a carcinomatous gland was removed from the axilla.

Radiograph.—All the cervical vertebral bodies are hazy from secondary deposits: the occipital bone shows evidence of involvement. The head is obviously held forward, thus accounting for the concavity noted above. An A P. view showed marked diminution in the depth of the intervertebral discs.

Late F. H. FRIER

Mr J. LEWIN.

Fig. 361.—MYELOMATOSIS. (See Fig. 58)

A child of about 10.

Radiograph —The pelvis and upper parts of the femora appear as though studded with snowflakes. On the left side the head of the femur appears about to separate from the shaft, on the right side this has already happened.

This is a generalised tumour formation of the marrow, associated with anaemia and Bence-Jones protein in the urine. Neuralgic pains occur, swellings appear on the ribs and skull: spontaneous fractures readily occur. (Synonyms: Kahler's Disease, Huppert's Disease, Myelopathic albuminuria, Bence-Jones albuminuria and lymphadenia.)

Dr W. H. ROWDEN.



FIG 359



FIG 360

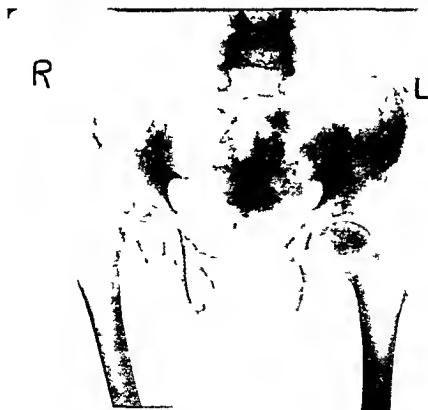


FIG 361

DISLOCATIONS

Fig. 362.—CLAVICLE. (See Fig. 15)

Clinical History.—The patient, a lad of 15, fell on his shoulder. Examination revealed a prominence over the acromio-clavicular joint, and the neck had lost its usual gentle sweep. The clavicle appeared shortened, due to its backward displacement, and the distance between the tip of the acromion and the suprasternal notch was decreased on the injured side.

Radiograph.—The acromio-clavicular joint is dislocated, the clavicle lying above and behind the acromial facet. The shoulder is drawn inwards by the pectoral and latissimus dorsi muscles, thus accounting for the shortened distance referred to. A flake of the clavicle, maintaining its attachment to the conoid and trapezoid ligaments, has been torn off.

A.P.B., *Brit. Jour. Surg.*, January 1923.

Late Mr Daw.

Fig. 363.—CLAVICLE. (See Fig. 27)

Clinical History.—Following a "scrum," a tender mass appeared at the sternoclavicular joint, weakness of the arm and pain at the site of the swelling developed. At times the patient was dyspnoeic. The left clavicle could be felt with its inner end displaced upwards and backwards.

Radiograph.—Note the sternal end of the clavicle above the second rib articulation, and clarity of the end of the clavicle unobscured by sternum and rib.

Operation (two months later).—An oblique fracture of the inner end of the clavicle, isolating a wedge of bone adhering to the sternum, was found. This wedge was removed.

Late Mr Daw.

Fig. 364.—ELBOW. (See Fig. 61)

Clinical History.—This occurred in a boy, aged 14, as the result of a fall. The arm assumed this position midway between flexion and extension, with an anterior fullness, and a loss of resistance posteriorly, which are typical of the condition.

Radiograph.—The articular surface of the ulna is empty, and the humerus lies against the anterior border of the radius. This situation of the humerus causes the anterior fullness, which was found to be very hard. It will readily be seen how the sigmoid fossa can be palpated, in consequence of this loss of resistance posteriorly.

Note that the internal lateral ligament remains intact below, having torn off the epiphysis of the internal condyle.

Fig. 365.—ELBOW. (See Fig. 61)

In this case, a boy of 18, it was difficult to interpret the curious displacement. Examination showed an internal dislocation. Reduction was easy.

The position was bad for X-raying owing to the deformity. The ulnar surface of the humerus apparently articulates with the head of the radius, the capitellum of the humerus lying free, away from the joint. The internal epicondyle has been torn off, lying at the level of the lower border of the olecranon.



FIG 362



FIG 363



FIG 364



FIG 365

DISLOCATIONS

Fig. 366.—RADIUS. (See Fig. 17)

The head of the radius lies free in front of the joint. There is a healed fracture of the shaft of the bone. The ulna and radius show some rarefaction, possibly the result of disuse following the accident.

Fig. 367.—METACARPAL. (See Fig. 6)

Clinical History.—As the result of an accident, a swelling appeared over the inner border of the hand.

Radiograph.—Reveals a dislocation of the fifth metacarpal at both proximal and distal joints. The displaced metacarpal has led to deviation of the third finger to the ulnar side owing to overlapping.

Fig. 368.—WRIST. (See Fig. 18)

Silhouette.—Note the thickening of the wrist.

Radiograph.—Whilst the semilunar has retained its articulation with the radius, the rest of the carpus is dislocated backwards. A small part of the os magnum is behind the semilunar, the rest is superimposed on the carpus.

Fig. 369.—PHALANX. (See Fig. 6)

Clinical History.—The tip of the thumb was bent backwards, with this result.

Silhouette.—The typical appearance of a dislocated phalanx.

Radiograph.—A dislocated ungual phalanx lies on the dorsum of the first phalanx of the thumb. The joint surfaces would be palpable provided the swelling was not too great. Note sesamoid bone.

Fig. 370.—THUMB. (See Fig. 49)

Clinical History.—A boy, aged 12, had his thumb wrenched backwards, sustaining the following injury.

Silhouette.—A wide space separates the thumb and index.

Radiograph.—The first phalanx and its epiphysis have parted company with its metacarpal. There is some opacity on the outer border of the thumb, probably traumatic in origin.

Treatment.—Reduction was possible only by operation, the result of which was good functionally but bad cosmetically. This may well prove to be one of the most difficult of all dislocations to reduce, the glenoid ligament proving a great obstacle.



FIG 366



FIG 367



FIG 368



FIG 369



FIG 370

DISLOCATIONS

Fig. 371.—SEPARATED EPIPHYSIS OF FEMUR. (See Fig. 64)

Radiograph.—The lower femoral epiphysis is dislocated forwards.

Remarks.—It will readily be seen how the lower end of the diaphysis may compress the popliteal artery, resulting in gangrene.

Dr L. A. ROWDEN

Fig. 372.—DISLOCATION OF HIP. (See Fig. 20)

History.—A woman, aged 21, had a motor accident.

Radiograph.—Note the elevation of the right great trochanter responsible for Bryant's and Nélaton's tests. The internal rotation of the femur is demonstrated by the clarity of the digital fossa.

These dislocations are met with most commonly amongst miners, as a consequence of masses of roof falling on them, when in a bent posture. Except in mining districts they are rare.

N.B.—The mottling of both iliac fossæ is due to gas in the colon.

Dr T. I. CANDY.

Fig. 373.—FRACTURE-DISLOCATION OF ANKLE. (See Fig. 22)

Silhouette.—Note the swelling of the ankle and the slight prominence anteriorly, due to the end of the tibia.

Radiograph.—A wedge of the tibia has maintained contact with the joint, the rest being dislocated forwards. The external malleolus is in position.

Fig. 374.—SACRO-ILIAC AND SYMPHYSIS: FRACTURE. (See Fig. 20)

Clinical History.—A man, aged 50, was run over by a horse and cart.

Radiograph.—The right half of the pelvis has been torn asunder from its opposite number, both sacro-iliac and symphysis pubis joints being dislocated. The ilium is the seat of many fractures. The left half of the pelvis is rotated, rendering the sacro-iliac joint very clear, the obturator foramen is almost obliterated. L. 5 is also affected.

F. TOILEY

Mr J. LEWIN.

Fig. 375.—FRACTURE-DISLOCATION OF THUMB. (See Fig. 6)

Radiograph.—The proximal end of the first phalanx of the thumb has been shattered, the metacarpal head has been comminuted, thus permitting of a dislocation. The metacarpal is split completely. The interphalangeal joint is injured, the joint space having disappeared.



FIG 371



FIG 372



FIG 373



FIG 375



FIG 374

DISLOCATIONS

Fig. 376.—FRACTURE-DISLOCATION OF THE EXTERNAL FEMORAL CONDYLE.
(See Fig. 22)

Radiograph.—The external condyle of the femur has been separated from the shaft by an inverted L-pattern fracture, and has lost contact with the tibia. The bones show definite senile changes.

N.B.—Calcification has occurred in the popliteal artery, which is tortuous, and in the posterior and anterior tibial arteries.

Late Mr Daw.

Fig. 377.—ANKLE. (See Fig. 24)

The tibia seems to be displaced forwards, and to be resting on the anterior edge of the articular surface of the astragalus, seen between the tibia and fibula, which joint is dislocated. The fibula appears to be displaced a little backwards on the astragalus, but this may not be so in reality. The parts have been filmed somewhat obliquely, and the concave side-to-side upper surface of the astragalus is shown. This, however, maintains its natural level with regard to the internal and external malleoli. A wide space separates tibia and fibula.

Fig. 378.—MID-TARSAL DISLOCATION. (See Fig. 25)

Clinical History.—The man slipped his foot into a crevice, and his ankle became deformed and acutely painful.

Radiograph.—Note the wrenching inwards of the whole foot just distal to the astragalus, so that the profile resembles a lateral rather than an antero-posterior view. This appearance is due to the inward dislocation of the foot at the astragalo-scaphoid joint; the bones are rarefied.

Treatment.—Reduction was readily accomplished.

Late Mr R LAWFORD KNAGGS.

Fig. 379.—HALLUX. (See Fig. 57)

Radiograph —The great toe projects from the metatarso-phalangeal joint, and a space, due to an internal dislocation of the ungual phalanx, separates it from the second toe.



FIG 376



FIG 377



FIG 378



FIG 379

ACUTE ARTHRITIS

Fig. 380.—GUNSHOT WOUND OF WRIST. (See Fig. 19)

The whole of the wrist-joint was shattered as the result of the wound, all its constituent fragments are rarefied.

Fig. 381.—SYPHILITIC SYNOVITIS OF KNEE. (See Fig. 54)

Clinical History.—A child, aged 9, had a painless swelling of both knees. The bridge of the nose was sunken, and the Wassermann reaction positive. Often there is pain giving rise to a pseudoparalysis

Radiograph.—This demonstrates absence of arthritis, and absorption of lime salts. Note the transverse striæ in the tibia

MR COUPLAND

Fig. 382.—SEPTIC ARTHRITIS OF WRIST. (See Fig 19)

Notes were unobtainable The condition was possibly due to a gunshot wound. Probably there was a compound fracture of the radius which was wired, but sepsis supervened, with destruction of the whole carpus and lower end of the radius; possibly sequestrotomies were done. The ulna was not involved, so the hand has been displaced bodily to the radial side, with the result that a line through the third metacarpal will pass along the radial border of the forearm, instead of up the middle of it. The position assumed is almost that of Madelung's disease, angulation having occurred.

Note the prominence near the little finger, caused by the end of the ulna.

Fig. 383 —ARTHRITIS OF KNEE. (See Fig 63)

The disease is limited to the inner articular surfaces, which are hazy and rarefied. An extra-articular abscess had formed, necessitating drainage; note the tube

N.B.—Ankylosis will no doubt follow



FIG 380



FIG 381



FIG 382



FIG 383

TUBERCULOUS JOINTS

Fig. 384.—SHOULDER: CARIES SICCA. (See Fig. 15)

Silhouette.—There is a conspicuous lack of fullness in the deltoid region, and decreased axillary girth (see Fig. 7). The position of slight abduction assumed, is the ideal one for ankylosis.

Radiograph.—The head of the humerus is much shrunken and rarefied, nearly all the greater tuberosity has disappeared. The head has lost its usual sharpness of outline, and passes insensibly into the scapula, with which ankylosis has occurred. The glenoid fossa and tips of the acromion and clavicle are deficient in lime salts.

Late Mr DOBSON

Fig. 385.—WRIST. (See Fig. 19)

Radiograph.—The whole carpus presents a fuzzy appearance, the joints having lost their sharp contours. The bones are rarefied save for the lower end of the radius and the scaphoid, which show condensation. The styloid process of the ulna has disappeared and the unciform lies almost free with part of the semilunar.

Fig. 386.—ELBOW. (See Fig. 16)

Radiograph.—The whole joint looks hazy, as though powder had been sprinkled on the film before printing. The lower end of the humerus passes imperceptibly into the ulna, meaning that ankylosis has occurred. The head of the radius is eroded. (Its apparent increase in density is due to superimposition of the ulna.) Frail bony processes project from the humerus and ulna. A sequestrum, almost free from calcium, is lying among the muscles.

Fig. 387.—ELBOW. (See Fig. 17)

Radiograph.—The articular end of the humerus has disappeared. The joint has been completely destroyed, and ankylosis of the humerus with the ulna, and almost certainly with the radius, has occurred. Sequestra are seen posteriorly.



Fig 384



Fig 385



Fig 386



Fig 387

TUBERCULOUS JOINTS

Fig. 388.—**ISCHIUM** (See Fig. 58)

Clinical History.—A girl of 11 was admitted in consequence of typical tuberculous sinuses on the buttock. The hip movements were perfect.

Radiograph.—Note that the tuber ischi is almost completely eaten away, leaving only a rarefied ramus and unaffected body.

MR FLINT.

Fig. 389.—**ILIUM**. (See Fig. 43)

Radiograph.—The ilium has a mottled appearance, areas of rarefaction being surrounded by others of sclerosis. The margin of the bone is grossly irregular, a sequestrum is present.

Fig. 390.—**HIP: PATHOLOGICAL DISLOCATION**. (See Fig. 53)

This occurred in a boy, aged about 12.

Silhouette.—Note the fullness of the buttock due to elevation of the great trochanter.

Radiograph.—The head of the femur has escaped from a diseased acetabulum; it has separated from the neck and is patchily sclerosed. The shaft of the femur has been drawn upwards and adducted, both of which are signs of neglect. The pelvis has been tilted on the diseased side.

Fig. 391.—**HIP TREATED**. (See Fig. 53)

The conditions here are similar to those in Fig. 390, but the head is in the joint, the limb having been treated by abduction. The upper part of the acetabulum is irregular and rarefied, and there are pieces of dense bone. The position is an ideal one for ankylosis.



FIG 388



FIG 389



FIG 390



FIG 391

TUBERCULOUS JOINTS

Fig. 396.—KNEE: ADULT. (See Fig. 22)

Radiograph—This case is an early one, loss of the usual distinctness being the main characteristic. There is a haziness about the articular margins of the tibia. The femur and patella are especially regular in outline, but deficient in lime salts

Fig. 397.—KNEE: ADULT. (See Fig. 22)

Radiograph.—This is a much more advanced case than Fig. 396. Two of the features of the classical “triple displacement” of the knee are indicated—namely, flexion and displacement of the tibia bodily backwards. Part of the articular surfaces of the femur and tibia lie free anteriorly and posteriorly, respectively. The tibia is ankylosed to the femur, as is also the patella. All bones in the vicinity are rarefied.

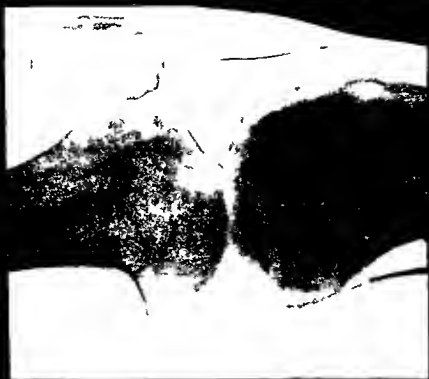


FIG 396



FIG 397

Fig. 398.—TUBERCULOUS KNEE. (See Fig 23)

Clinical History.—A woman, aged 38, developed a tuberculous knee at the age of 12. It was treated in plaster of Paris and splinting, and progressed favourably until one day it was manipulated, since when she has been in almost constant pain. Amputation was considered, but deemed inadvisable owing to severe heart disease. Examination revealed a triple displacement and great pain on movement; the joint was very swollen.

Radiograph.—The internal and backward displacement of the tibia is apparent. The joint surfaces are extensively eroded, the patella is less affected than the other parts of the joint. Scattered throughout the synovial membrane are calcareous foci. All bones are deficient in calcium.

Subsequent History.—The limb was straightened by means of a Thomas's hip-splint and weight extension, which relieved the pain considerably. It was then put in plaster of Paris for eight weeks, when there was a sudden escape of a large amount of pus containing numerous caseous particles. It was then decided to amputate as the only means of saving life. This was successfully performed under spinal anaesthesia; some sinuses persisted for some time however.

Mr E J BARBER

Mr A P BERTWISTLE.

Fig. 399.—HALLUX RIGIDUS (See Fig 26)

Clinical History.—For many years, a man, aged 38, had pain and difficulty in dorsiflexing the great toe. The skin over the joint was somewhat atrophic.

Radiograph.—A large pedunculated osteophyte is seen projecting backwards from the head of the first metatarsal on its dorsal aspect. There is some lipping of the base of the first phalanx of the hallux.

Mr E J BARBER

Mr A P BERTWISTLE.

Fig. 400.—GOUT. (See Fig 6)

Clinical History.—The patient, aged 53, had persistent swelling of the backs of both hands and fingers for some time, but, until two days before examination, had carried on his work as a navvy.

Radiographs.—Left, the thumb is bulbous and its interphalangeal joint disorganised. This bulbous appearance is possibly cystic, originating in a bony focus opening outside or spreading from the joint; it contains serous fluid impregnated with sodium urate crystals. The index metacarpo-phalangeal joint is even more extensively eroded, great swelling being apparent. Large swellings are present in the middle and little fingers, the joints being affected.

Right, the index metacarpo-phalangeal joint is involved, effusion being present. The first interphalangeal joint of the ring-finger is markedly diseased. There is a calcareous deposit in the metacarpal region of both hands.

NB—The usefulness of such fingers is surprising, even when the joint surfaces are disorganised, doubtless due to the large amount of fibrous tissue in which the urates are deposited.

Mr E J BARBER

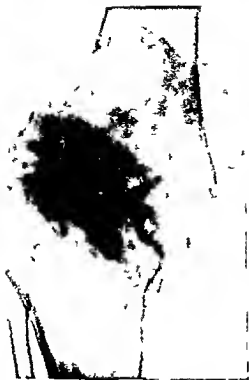


FIG 398



FIG 399



FIG 400

TUBERCULOUS JOINTS

Fig. 401.—KNEE. (See Fig. 36)

Silhouette.—Note the swelling of the knee joint and the wasting of the muscles of the leg.

Radiograph.—Extensive disease is present, the epiphysis of the femur has almost disappeared. Owing to scattered calcification the knee joint is itself visible.

Fig. 402.—TUBERCULOUS KNEE: ACTIVE. (See Fig. 63)

Radiograph.—The epiphyseal lines are about to disappear, fixing the age at about 20. The bones are very deficient in lime salts, a feature of the disease; the articular surfaces have lost their sharp outline, the upper end of the fibula is almost radiolucent. The articular surface of the inner condyle is very hazy; here ankylosis is liable to develop.

Dr W. H. ROWDEN.

Fig. 403.—KNEE: STARTING IN THE TIBIA. (See Fig. 54)

Clinical History.—The patient, a boy of 4, had become “knock-kneed” during the last few weeks. He had not complained of pain.

Radiograph.—The outer half of the articular surface of the tibia has disappeared, as has part of the shaft, thus permitting the genu valgum. An abscess related to the fibula shows calcification.

Treatment.—The abscess was scraped, the microscope confirmed the granulations to be tuberculous.

Late Mr BRAITHWAITE.

Fig. 404.—KNEE. (See Fig. 44)

Radiograph.—In the centre of the femoral epiphysis is an abscess, the epiphyseal lines and articular surface are inflamed in sympathy.

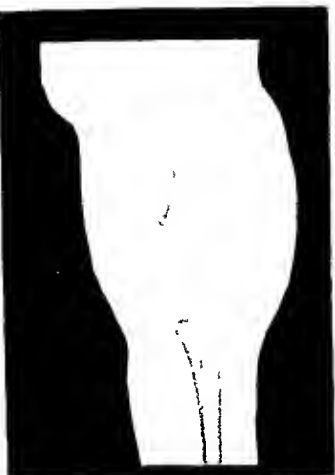


FIG 401



FIG 402

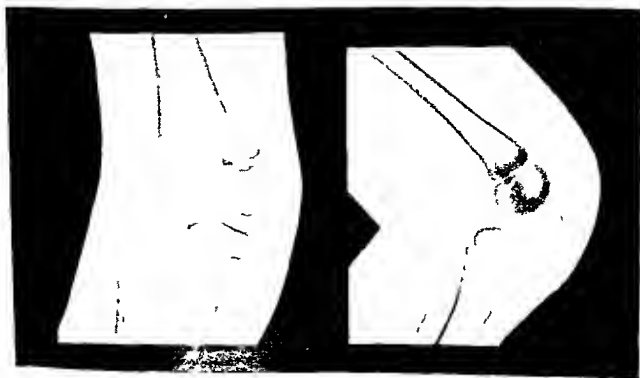


FIG 403



FIG 404

Fig. 405.—TUBERCULOUS CAVITY IN THE OS CALCIS. (See Fig 24)

Clinical History.—The patient, a woman, aged 50, had a chronic sinus on the outer side of the foot for twelve months. There were no signs of tabes.

Radiograph.—A round area of comparative radiolucency is obvious below the sustentaculum tali; the rest of the bone is normal. In the area of rarefaction is a sequestrum

MR COLLINSON

Fig. 406.—TUBERCULOUS OS CALCIS. (See Fig 65)

Silhouette.—Note the massive swelling of the heel

Radiograph.—The os calcis has disappeared, save for its anterior end and a few vestiges elsewhere. The case was probably one of tuberculous infiltration. What is left of the os calcis is denser than the adjacent bones.

Fig. 407.—TUBERCULOUS TARSUS. (See Fig. 24)

The tarsus appears welded together, except for part of the ankle-joint, the calcaneo-cuboid articulation, and that of the internal cuneiform with the first metatarsal. This picture emphasises the intercommunication of certain joints of the foot.

Fig. 408.—TUBERCULOUS TARSUS. (See Fig 66)

Silhouette.—Note the swelling of the ankle.

Radiograph.—The same joints are involved as in Fig. 407, together with the ankle. The bones in the neighbourhood of the disease are decalcified.



FIG 405



FIG 406



FIG 407



FIG 408

CHARCOT'S JOINTS

Fig. 409.—HIP. (See Fig. 20)

Radiograph.—The head and almost the whole of the neck of the right femur have disappeared. The acetabulum is eroded and expanded, its rim is osteophytic, there being signs of ossification in the capsule. Destruction is much more in evidence than new bone formation, but the latter is probably greater than is shown in the skiagram.

The left femur was deficient in lime salts, and presented an osteophyte at the lower part of the head, which might develop into a Charcot's joint. The hip is the commonest site of the parasyphilitic variety.

Fig. 410.—CHARCOT'S HIP. (See Fig. 20)

Clinical History.—When first seen 18 months previously the man complained of symptoms suggesting sciatica; his right thigh was $1\frac{1}{2}$ inches thicker than the left. He had numerous "tissue-paper" scars of the skin and Rhombergism, but his Wassermann was negative. Large doses of potassium iodide were administered; at the time of the radiograph he had great pain in the right hip.

Radiograph.—The head of the femur and some of the neck have disappeared; the joint is occupied by a mass of bony and calcareous masses representing the final constructive stage of a Charcot's joint, which follows on the destructive stage portrayed in the previous figure.

N.B.—The pain, persistence of the neck, absence of ataxia are unusual in this condition.

Late F. H. FRIER

Dr E. HOLMES WATKINS

Fig. 411.—ELBOW: SYRINGOMYELIA. (See Fig. 17)

Clinical History.—A case of syringomyelia. The patient had some pain two years previously, but since then the joint had been painless, though flail-like and useless. Subjective symptoms were present, but no pain, the knee-jerks were normal. There was loss of sensation of heat and cold.

Radiograph.—Observe the complete disintegration of the joint and the masses of new bone formation; the bones are hopelessly entangled. The formation of osteophytes some distance from the joint is characteristic of the disease.

This is the commonest joint affection of syringomyelia.

Dr BURROW.

Fig. 412.—ELBOW: SYRINGOMYELIA. (See Fig. 17)

No notes were available, but the case has been inserted here in the belief that the condition was probably syringomyelia. The end of the humerus is atrophic, and mushroom-like growths project from the humerus above the articulation.



FIG 409



FIG 410

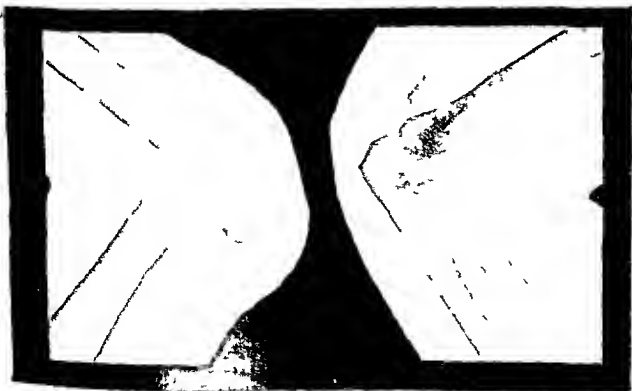


FIG 411

FIG 412

Fig. 416.—COXA VARA. (See Fig 43)

Radiograph.—A line passing through the centre of the neck would subtend an angle less than a right angle with the shaft. The lower part of the head is mushroomed, exactly as though butter was pressed against a hard acetabulum. The calcar femorale is curved.

Late Mr DAW

Fig. 417.—CONGENITAL DISLOCATION OF HIP. (See Fig 43)

Clinical History.—For this girl, aged 15 months, advice was sought on account of lateness and clumsiness in attempting to walk. There was some increase in the prominence of the left great trochanter; all movements except abduction were free. Telescopic movement was obtained. The right hip was normal.

Radiograph —Note the acetabulum has not developed and is empty. The head of the femur, which is almost normal, rests on the dorsum illi. If the condition was allowed to go untreated a false joint would form, the head of the femur would become mushroomed, and the neck shortened.

Late Mr BRAITHWAITE

Fig. 418.—PSEUDO-COXALGIA (LEGGE-CALVÉ-PERTHE'S DISEASE). (See Fig. 43)

Clinical History.—A child, aged 7, was brought on account of a limp, which had gradually developed without any assignable cause. Examination showed some limitation of abduction, and slight interference with flexion.

Radiograph.—The head of the femur is much increased in size, and its articular surface is mushroomed, so that the epiphyseal line of the head is lengthened. The neck of the bone has not developed, and Shenton's line has lost its regularity. The acetabulum is shallow to accommodate the larger head, in places it appears to be undergoing a similar change.

Late Mr DAW

Fig. 419 —HEALED PSEUDO-COXALGIA (See Fig 43)

Radiograph.—The mushroomed head of the femur is very characteristic. The acetabulum has shared in the softening, its lips having disappeared.



FIG 416



FIG 417

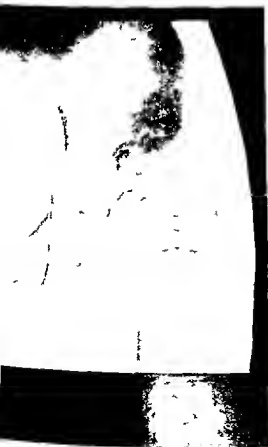


FIG 418



FIG 419

Fig. 420.—OSTEO-ARTHRITIS OF HIP. (See Fig. 20)

Clinical History.—The patient, a woman of 59, had difficulty in walking. Movements were limited and painful.

Radiograph —The joint surfaces are irregular, the head of the femur is in process of ankylosis. Osteophytes project from the acetabulum, and were no doubt the cause of the limitation of movement and pain.

Late Mr BRAITHWAITE

Fig. 421.—OSTEO-ARTHRITIS OF KNEE. (See Fig. 22)

Radiograph.—Large osteophytic growths project into the synovial cavity. Behind the patellar ligament is a dense spherical mass of bone, but there is an isolated mass of bony material in the quadriceps tendon. There is no evidence in the skiagram of osteophytes lying free in the joint.

Fig. 422.—RHEUMATOID ARTHRITIS. (See Fig. 6)

Silhouette —The characteristic distortion of the fingers and ulna deviation of the hand are in evidence, also Haygarth's nodes.

Radiograph —The proximal interphalangeal joints are the worst affected, bony union appearing to be imminent, they show extensive osteophytic outgrowths. The joint spaces elsewhere are clearly defined. The metacarpo-phalangeal joints are normal, save possibly the thumb. The carpus and the lower end of the radius are deficient in calcium, the joints are coalescing.

Late Dr GRIMITH

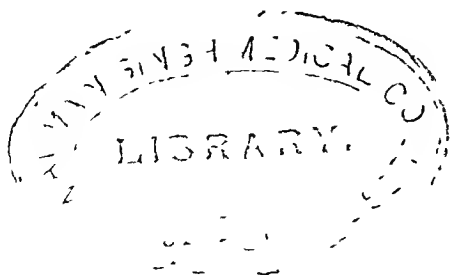




FIG 420



FIG 421

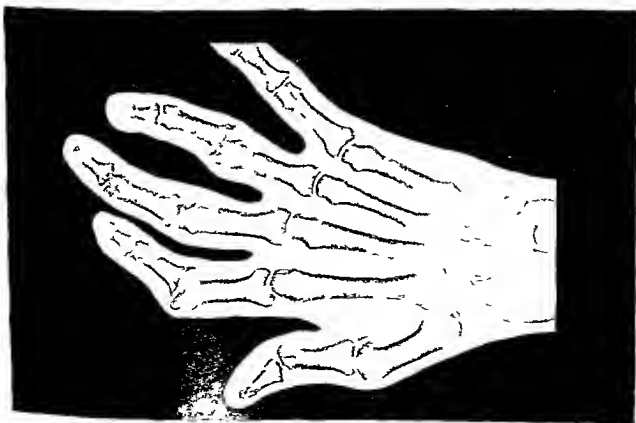


FIG 422

EXCISION OF JOINTS

Fig. 423.—WRIST. (See Fig. 19)

Radiograph.—Almost the whole of the carpus, and the base of the fifth metacarpal, having been removed, three bony fragments of the carpus remain on the ulnar side. The end of the radius has lost its concavity, and articulates with the metacarpus. All the bones are less dense than normal.

Fig. 424.—ELBOW. (See Fig. 61)

Clinical History.—The patient, a girl aged 14, developed a swelling of the elbow about a year previously; treatment by splinting was unsuccessful. Excision was done, and early passive movements instituted. Two months later the arm was moving freely through ninety degrees, but supination was somewhat difficult. Two years later there had been no recurrence, and movement was nearly normal, but tuberculous disease had attacked the ankle

Note the loss of many bony landmarks, the lower end of the humerus and the olecranon having been removed.

M. COLLINSON

Fig. 425.—KNEE: ANKYLOSIS (See Fig. 23)

The articular surfaces and the patella have been removed, and the femur and the tibia united by bone. Considerable genu valgum has resulted.

Fig. 426.—KNEE. (See Fig. 63)

Radiograph.—The articular surfaces of femur, tibia, and fibula have been erased. A part of the articular surface of the tibia is visible, as the bones are not in good apposition, overlapping being present. There is a doubtful patch of disease in the femur.



FIG 423



FIG 424



FIG 425



FIG 426

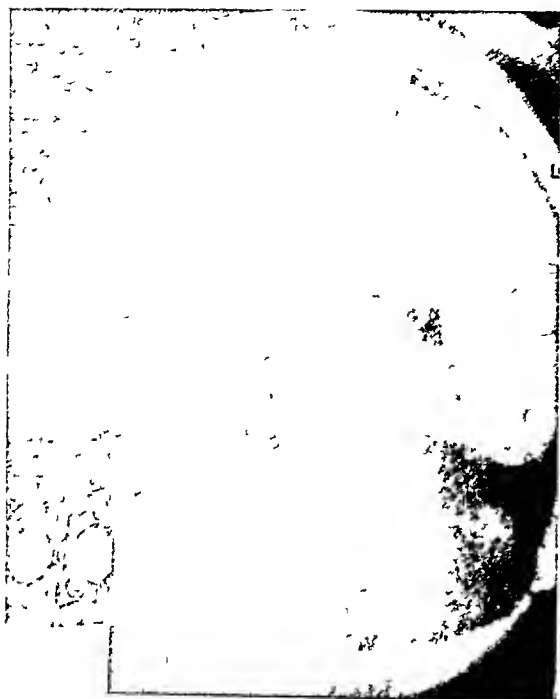


FIG 427



FIG. 428

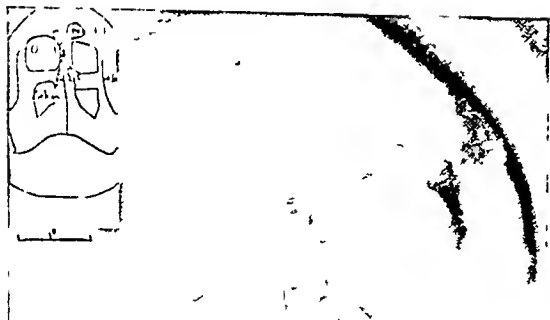


FIG. 429

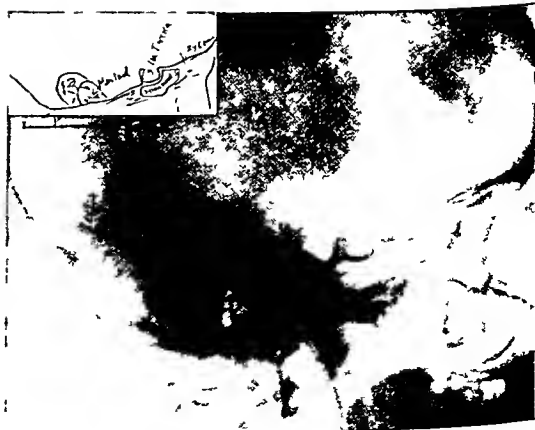


FIG. 430

Fig 427—NORMAL FRONTAL SINUS

A male of 50

Radiograph (Superior-Inferior)—Normal sinuses are seen internal to and above the orbits, with processes like a young stag's horns, the septum lying between

Late Dr THURSTAN HOLLAND

Late Sir WM MILLIGAN

Fig 428—NORMAL ANTRUM

A boy of 15

Radiograph (Postero-Anterior)—Clear, symmetrical air sinuses are visible below the orbits

Dr W H ROWDEN

Fig 429—NORMAL ANTRUM

Radiograph (Superior-Inferior)—The antra are seen even better than in the previous position

Dr W H ROWDEN

Fig 430—NORMAL SPHENOIDAL SINUS

A man of 45

Radiograph (Lateral)—The sphenoidal sinus is clearly visible below and in front of the sella turcica. The mastoid cells are well seen

Dr W H ROWDEN

Fig. 431.—FRONTAL SINUSITIS. (See Fig. 427)

Radiograph (Postero-Anterior view, twenty-five degrees to baseline)—Marked obscurity of both frontal sinuses—the right being the denser. The maxillary antra are clear.

A lateral view showed both sinuses to be well developed.

Dr J M W MORISON

Late Sir Wm. MILLIGAN

Fig. 432.—LEFT FRONTAL SINUSITIS. (See Fig. 428)

Clinical History.—A male, aged 19, complained of intermittent attacks of severe frontal headache which came on in the morning and were accompanied by unilateral purulent nasal discharge. Pressure over the sinus elicited pain.

Transillumination.—The left sinus was quite opaque and the right slightly so.

Radiograph.—Shows complete disappearance of the frontal air cells of the left side and some change on the right.

Operation.—An incision was made over the sinus and its cavity obliterated, recovery with some deformity ensuing.

Dr W. J S BYTHELL.

Late Sir Wm. MILLIGAN

Dr A L BARCLAY

Fig. 433.—ANTRUM (SUPPURATION). (See Fig. 429)

Radiograph (Superior-Inferior)—The right antrum is relatively opaque compared with the left, its contents being mucous.

Dr L A ROWDEN

Fig. 434.—ANTRUM (SUPPURATION). (See Fig. 429)

Clinical History.—A woman, aged 56, had an empyema of the antrum drained ten years previously. Since then she had a "clogged up" feeling, accompanied by pain at the back of the head and neck.

Radiograph (Superior-Inferior).—Instead of radiolucency, both antra present a hazy appearance.

Dr W H ROWDEN



FIG 431

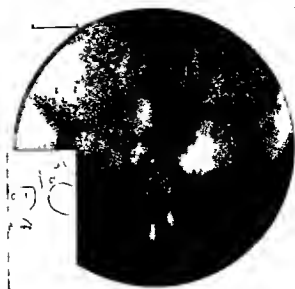


FIG 432



FIG 433



FIG 434

Fig. 435.—ETHMOIDAL SINUSITIS. (See Fig. 428)

Clinical History.—A man had suffered from a nasal discharge for some time.

Radiograph (Postero-Anterior).—The right antrum and ethmoidal sinuses are dense compared with those of the left side. There is a sequestrum in the ethmoid bone.

Dr W. H ROWDEN.

Fig. 436.—MAXILLARY ANTRUM. (See Fig. 428)

Radiograph.—On the right side the maxillary antrum is radiolucent, on the left side it is opaque, which opacity is uniform, and there is no indication of bone involvement, thus ruling out malignant growth.

Dr L. A ROWDEN.

Fig. 437.—SARCOMA OF MAXILLA. (See Fig. 429)

Clinical History.—A woman, aged 60, had symptoms of growth in the nose, for four months.

Radiograph.—The right antrum is absolutely opaque. There is obliteration of the bony detail of the right maxilla and walls of the orbit and nose, which is the cardinal sign of malignancy.

Dr W. H ROWDEN

Fig. 438.—TUMOUR OF LEFT ORBIT. (See Fig. 429)

Clinical History.—A girl, aged 15, had a history of proptosis and sudden loss of vision three years ago; since then the condition has been stationary.

Radiograph (Postero-Anterior) —Uniform enlargement of the orbital cavity is shown. That the tumour arises from the soft parts is shown by the preservation of the bony detail.

Dr W. H ROWDEN

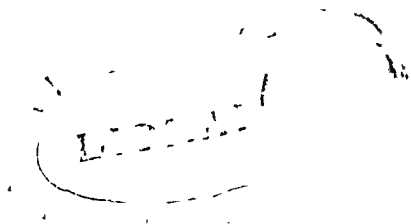




FIG 435



FIG 436



FIG 437



FIG 438



FIG. 439



FIG 440



FIG 441



FIG. 442

Fig 439 —NORMAL NASAL SINUSES

Radiograph —Superior-Inferior position

Mr C D ROBERTSON

Fig 440 —NORMAL ANTROGRAM *

*Superior Inferior —*The contour of the antrum is uniform, with the exception of a small bay caused by the teeth

Mr G D ROBERTSON

Fig 441 —NORMAL ANTROGRAM

*Lateral —*The outline of the antrum is clean cut, a projection below corresponds to the upper teeth

Mr C D ROBERTSON

Fig 442 —PATHOLOGICAL ANTROGRAM

*Superior Inferior —*The left antrum is normal but the right shows gross irregularity due to polypi, some retained secretion is visible above

Mr C D ROBERTSON

* Antrograms are prepared by filling the antrum of Highmore with lipiodol

Fig. 447.—NORMAL LOWER MOLARS

Radiograph—Note the well-marked lamina dura, the condensation of bone beyond the radiolucent periodontal membrane. The interdental spaces are flat, sharply defined, and extend well up the teeth.

Mr O A MARXER.

SIR EDMUND SPRIGGS

Fig. 448.—NORMAL TEETH AT AGE OF 6

Radiograph—How order can come out of such chaos must remain a mystery. The central incisor reveals the open apex of the immature tooth. The permanent lateral incisor has also an open apex, it is in the act of pushing out its predecessor. The permanent canine is very dense, it also is extruding its corresponding milk tooth.

Mr O. A. MARXER.

SIR EDMUND SPRIGGS

Fig. 449.—PYORRHOEA ALVEOLARIS

Radiograph—Bone has receded, leaving the teeth, like stones on the seashore, high and dry. There is a quantity of tartar which, by virtue of its high calcium content, is opaque to X-rays.

Mr O A MARXER

SIR EDMUND SPRIGGS

Fig. 450.—PYORRHOEA ALVEOLARIS

Radiograph—The alveolus has become so absorbed that the roots of the tooth are exposed at their junction with the crown. The lamina dura has disappeared, the periodontal space is very wide.

Mr O A MARXER

SIR EDMUND SPRIGGS

Figs 451-456.—DENTAL SEPSIS AND CONSTITUTIONAL DISEASE

Clinical History—A male, aged 49, had a severe attack of subcutaneous erysipelas at the age of 27, the right leg becoming greatly swollen and inflamed, with involvement of the inguinal glands, all these developed in the space of half an hour. Many attacks, less severe, followed. Many opinions were sought, until finally Mr McAdam Eccles declared it to be due to a heavily filled molar tooth which X-rays revealed to have an abscess at its apex. The tooth was extracted. No further attacks occurred for a year, when a crowned tooth became tender, this was removed. No more trouble occurred for eight years, when another heavily filled tooth became tender, it had an apical abscess. Two more teeth were extracted for similar attacks, then for the last year many not very severe manifestations developed, no single tooth could be blamed, but all had become faintly tender on moving from side to side with the thumb and finger. There was not, and never had been, any toothache. A wholesale clearance was effected.

Radiographs—Fig 451.—Upper right molar is not well seen, but there is complete loss of the lamina dura. Examination of the tooth after extraction showed the palatal root to be absorbed, the posterior buccal root showed absorption and eburnation, both signs of sepsis. The apex of the anterior buccal root was missing. Tooth heavily filled, with small areas of caries.

Fig 452.—Canine tooth shows alveolar absorption all round, with absence of lamina dura, the incisors show alveolar absorption, ill-defined lamina dura and thickening of apices.

Fig 453.—Upper left bicuspid reveals alveolar absorption with tapering of root end, lamina dura ill-defined. Caries in anterior aspect of root. Upper left molar the tooth has been almost extruded by alveolar absorption, lamina dura is only present at apex. Examination of the tooth showed roots to be fused into one thin bent extremity, absorption being of the pumice type, i.e., rather roughened. A small septic filling and mesial caries were present.

Fig 454.—Lower right molar heavily filled and with a root-filling. Areas of alveolar absorption, lamina dura absent, caries posteriorly. Subsequent study of this tooth revealed caries under and around a heavy filling. The roots were much shortened and eburnated by absorption, the tooth was septic.

Fig. 455.—The lower incisors are not well seen but show alveolar absorption and tartar formation separating teeth from gum.

Fig 456.—The lower left bicuspid shows alveolar absorption, the left lower molar is very heavily filled, much caries present and a suggestion of apical rarefaction. Examination of the extracted tooth revealed pointed and eburnated roots, the tooth was septic, with caries at the gingival margin.

During the three months taken in extracting the teeth there were one mild and two ridiculously mild attacks with no constitutional disturbances. Such attacks are not infrequent and are due to stirring up the focus of infection. (See Figs 478, 488, 489.)

P S—The tooth with the root-filling had lasted for twenty-five years.

Mr J B FORGAN

Mr H. T. ROPER HALL
Mr A. P. BERTWISTLE



FIG 147

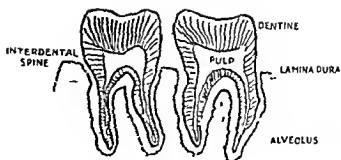


FIG 148



FIG 149



FIG 150



FIG 151



FIG 152



FIG 153



FIG 154



FIG 155



FIG 156

Fig. 457.—SENILE REGRESSION OF ALVEOLUS

Radiograph.—The whole of the body and part of the roots of the molar and second bicuspid are unsupported by bone

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 458.—PYORRHOEA ALVEOLARIS

Radiograph.—Extensive absorption of alveolus and periapical periodontitis are present. The boy, aged 8, had incisors 5 mm too long, and, in an attempt to save them at this late date, they were pegged to the adjoining teeth. Four years later several teeth and necrosed bone had to be removed.

Mr. O. A. MARXER

Sir EDMUND SPRIGGS.

Fig. 459.—APICAL ABSCESS

Radiograph —Owing to a cementoma the second premolar root has been fractured and left in position, effectually sealing up an abscess cavity. This case emphasises the necessity of X-raying edentulous jaws in cases of persistent symptoms of focal sepsis.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 460.—FRACTURED INTERDENTAL SPINE

Radiograph.—The spine is seen to have parted from the alveolus: a fragment of root remains anteriorly.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 461 —APICAL ABSCESS

Radiograph.—At the apex of the right lateral incisor is a typical crescentic area of rarefaction due to abscess: the continuity of the lamina dura has been broken. There is considerable absorption of the roots of the incisors, caries is present in both canines.

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 462.—MISPLACED, UNERUPTED CANINE

Radiograph —Instead of lying at right angles to the jaw the canine lies at an angle, possibly impinging on the central incisor, which is carious. The lateral incisor, devoid of root, is infected, and is about to be shed, the canine pushing it out.

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 463.—CHRONIC PERIODONTITIS

Radiograph.—The two incisors appear to be hanging in space, having no bone about them, only the periodontal membrane keeping them in position

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 464.—UNERUPTED CANINE: IMMATURE APICES

Radiograph.—An unerupted canine tooth is seen impinging on the lateral incisor: this and the central have their apices still wide open being immature.

Mr J. B. FORGAN.

Mr J. B. FORGAN.



FIG 457

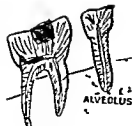


FIG 461



FIG 458

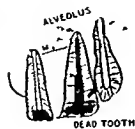


FIG 462



FIG 459



FIG 463



FIG 460



FIG 464

Fig. 465.—ALVEOLAR ABSCESS

Radiograph.—A large abscess cavity has been curetted. Note the necrosed interdental spines.

Mr O. A. MARXER

Sir EDMUND SPRIGGS.

Fig. 466.—CEMENTOMA

Radiograph.—On the root of the first upper premolar is a bulbous cementoma. Around this and the second premolar is an incipient abscess, recognised by the circular formation of the trabeculae at the apices, encroaching on the floor of the antrum. An abscess sac was extracted with each tooth.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 467.—BURIED ROOTS

Radiograph.—Two roots are seen, occluding abscess cavities.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS

Fig. 468.—PYORRHOEA AND PERIODONTITIS

Radiograph.—The whole of the body of the first premolar is visible, due to regression of the alveolus. Bone has disappeared between the roots and a sinus has formed.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 469.—CHRONIC PYORRHOEA

Radiograph.—There is marked thickening of the periodontal membrane about the incisor teeth. The lamina dura has disappeared, as have the "spikes" of bone between the teeth.

Mr J. B. FORGAN.

Mr J B FORGAN

Fig. 470.—SENILE ATTRITION OF TOOTH

Radiograph.—The worn-down teeth of a man of 70. There has been encroachment on the pulp chambers by odontoblasts

Mr J B. FORGAN

Mr J B FORGAN.

Fig. 471.—CHRONIC ABSCESS

Radiograph.—Around the apex of one central incisor is a crescentic area of radiolucency in which no bone trabeculae are visible, there is some absorption of the root. The abscess is spreading to the lateral incisor.

Mr J. B. FORGAN

Mr J B FORGAN

Fig. 472 —APICAL ABSCESS

Radiograph.—In the centre is a crowned premolar tooth which has been partially root-filled; at its apex is an abscess. The first premolar is carious.

Mr J B FORGAN

Mr J B FORGAN.



FIG 465



FIG 469



FIG 470



FIG 466



FIG 471



FIG 467

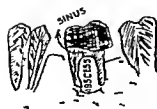


FIG 472



FIG 468

Fig. 473.—CROWNED TEETH

Radiograph.—Two crowned premolars with root-fillings are seen; the second one shows periodontitis, whilst the first bears its crown well.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Figs. 474 and 475.—PERIAPICAL ABSCESS

Radiograph—A large abscess is seen beneath the incisors and canine. the tips of the former have become absorbed The antrum contained pus Note sharp apices of teeth.

Mr. O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 476.—CEMENTOMA

Radiograph.—The mesial root of the dead first molar shows a bulbous cementoma. The lamina dura is much sclerosed

Mr O. A. MARXER

Sir EDMUND SPRIGGS.

Fig. 477.—PULP STONES

Radiograph—In the pulp chambers of the central incisors are seen large stones. which represent Nature's only method of dealing effectively with suppuration in the pulp

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 478.—RESIDUAL INFECTION: MANDIBLE

Clinical History.—Same case as Figs 451-456, 488 and 489 The patient had three attacks of subcutaneous erysipelas since all teeth had been extracted eighteen months previously The gum in the incisor region was tender and slightly swollen

Radiograph.—The typical feather edge of persistent residual infection is manifest. not an uncommon finding in this region A slight bony prominence is seen to the right of the midline. Contrast with Fig. 479

Treatment.—Easing of the lower denture, penicillin lozenges, painting of the gum with aconite and iodine is recommended, failing which, an alveolectomy.

Mr ROPER-HALL.

Fig. 479.—NORMAL EDENTULOUS MANDIBLE

Radiograph—The bone presents a uniform appearance with trabeculae uninterrupted.

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 480.—CARIES IN FIRST AND SECOND MOLARS: IMPACTION OF THIRD

Radiograph—Caries is in evidence in the crowns of the first and second molars. which otherwise are healthy, showing clear-cut laminae dura and "tables" (the alveolar margins of bone between the teeth). The third molar impinges on the second.

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 481.—HEALING TOOTH SOCKET

Radiograph—Note the rarefied bone being laid down in the position once occupied by a tooth The other teeth are normal

Mr J B FORGAN

Mr J. B. FORGAN

Fig. 482.—INTERSTITIAL CARIES

Radiograph.—Interstitial caries is absorbing the roots of the central incisors. The alveolar bone has been absorbed, leaving the roots merely surrounded by mucous membrane

Mr J. B. FORGAN.

Mr J. B. FORGAN.



FIG 473



FIG 478

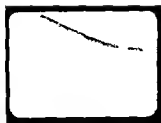


FIG 479



FIG 474



FIG 475



FIG 480



FIG 476



FIG 481



FIG 477



FIG 482

Fig. 483.—APICAL ABSCESS—MARBLE BONE

Radiograph—Around the apex of the lateral incisor is an abscess. The alveolus around the abscess presents the "marble bone" appearance first described by Albers Seholenburg.

Mr O. A. MARXER.

SIR EDMUND SPRIGGS.

Fig. 484.—PERIAPICAL CYST

Radiograph—Around the apex of the second premolar is a radiolucent cyst.

Mr O. A. MARXER.

SIR EDMUND SPRIGGS.

Fig. 485.—PYORRHOEA ALVEOLARIS

Radiograph—Only the middle tooth has its apex embedded in bone. It was found by the dental surgeon to be alive.

Mr O. A. MARXER.

SIR EDMUND SPRIGGS.

Fig. 486.—CEMENTOMA

Radiograph—The root of the second premolar shows a large cementoma.

Mr O. A. MARXER.

SIR EDMUND SPRIGGS.

Fig. 487.—APICAL ABSCESS

Clinical History—A woman, aged 27, sought advice for a gland on one side of the neck.

Radiograph—At the root of a heavily filled premolar is an abscess which is tracking out behind the tooth towards the mouth. On its removal the gland resolved.

Mr G. CLARE.

Mr G. CLARE.

Mr A. P. BERTWISTLE.

Figs. 488 and 489.—APICAL ABSCESSSES

Clinical History—Same case as Fig. 451. These two teeth each occasioned an attack of subcutaneous erysipelas.

Fig. 488—The second premolar is heavily filled, at its apex is the typical crescentic area of rarefaction denoting abscess formation. The table between it and the molar has disappeared, it is clearly seen behind the canine. On extraction the tooth was found to be full of pus.

Fig. 489—The first molar is the seat of caries below a large filling and above the posterior root. Extraction revealed a dead tooth.

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 490.—MISPLACED PREMOLAR

Clinical History—A swelling was noted in the hard palate which later proved to be a tooth, which, as it could not be accommodated in an already full mouth, was extracted. The second premolar is seen "end on" between the first premolar and molar.

Mr J. B. FORGAN.

Mr J. B. FORGAN.



FIG 483



FIG 487



FIG 484

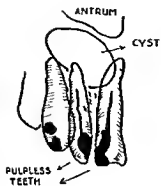


FIG 488



FIG 485



FIG 489



FIG 486



FIG 490

Fig. 491.—PERIAPICAL ABSCESS

Radiograph.—Around the apices of the filled first molar are two large abscesses.

MR O. A. MARXER.

SIR EDMUND SPRIGGS

Fig. 492.—IMPACTED WISDOM TOOTH: BURIED ROOTS

A woman of 23 complained of neuralgia and earache.

Radiograph.—The lower wisdom tooth is impinging on the second molar, which is the seat of caries beneath a large amalgam filling. In front of the latter is a buried root of the first molar.

Treatment.—As the second molar was carious it was extracted to make room for the third. As there was no evidence of infection, the root was left.

MR MOWATT

Fig. 493.—ATROPHIED PERIODONTAL MEMBRANE

Radiograph.—The appearance is as though the tooth and bone have fused.

MR O. A. MARXER.

SIR EDMUND SPRIGGS.

Fig. 494.—INTERPROXIMAL RADIOGRAPH

Radiograph.—To show that apposition and interdental spaces are normal.

MR O. A. MARXER.

SIR EDMUND SPRIGGS

Fig. 495.—DENTAL CYST

Clinical History.—A hard, painless swelling had been present for a year.

Radiograph.—A large radiolucent cyst is present near the angle of the jaw; on its buccal surface is a slight opacity, possibly a tooth root. (Almost bisecting the cyst is the shadow of a calcified stylo-hyoid ligament.)

DR W. H. ROWDEN.

Fig. 496.—ACCESSORY TEETH. (See Fig. 33)

In this extraordinary case the facial bones appear studded with ectopic teeth.

Late Dr R. KNOX.



FIG 491

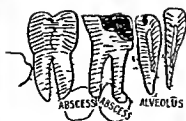


FIG 492



FIG 493



FIG 494



FIG 495



FIG 496

Fig. 497.—DENTIGEROUS CYST. (See Fig. 13)

Clinical History.—A large disfiguring swelling had developed over the right lower jaw of a boy aged 11. It had a papyraceous feel and was slightly painful.

Radiograph.—A cyst occupies the mandible in the neighbourhood of its angle. Embedded in its lowest part is a fangless tooth.

Operation.—The cavity was opened from the mouth and the tooth removed. After scraping out the cyst wall it was packed, a complete cure ensuing.

Dr W J S BYTHELL

Late Sir WM MILLIGAN

Dr A. E. BARCLAY.

Fig. 498.—IMPACTED TEETH

Clinical History.—The patient, aged 46, had trouble in the fitting of a denture, but no pain or swelling.

Radiograph.—The second and third molar teeth lie horizontally with their cusps impacted against each other.

Mr E. J. BARBER

Mr R. HAGGARTY

Fig. 499.—IMPACTED THIRD MOLAR

Clinical History.—The man, aged 39, had suffered from pain for seven years.

Radiograph.—The root of the wisdom tooth is impacted against the second molar, causing osteitis.

Subsequent History.—Owing to the impossibility of removing the wisdom tooth the second molar was extracted, with relief of pain.

Mr J. B. FORGAN.

Mr J. B. FORGAN

Fig. 500.—ALVEOLAR ABSCESS

Clinical History.—A woman of 35 was referred on account of rheumatism; the lateral incisor and canine were loose.

Radiograph.—Behind the lateral incisor is an apical abscess extending to the canine. Marked recession of the gum is evident.

Subsequent History.—Improvement occurred.

Mr J. B. FORGAN.

Mr J. B. FORGAN.

Fig. 501.—IMPACTED CANINE

Clinical History.—Pain and swelling in the region of the lateral incisor.

Radiograph.—A dense canine tooth is seen impinging on the lateral incisor, the crown of which is decayed and shows the remains of two fillings.

Subsequent History.—Extraction under local anaesthesia resulted in cure.

Mr J. B. FORGAN.

Mr J. B. FORGAN



FIG 497



FIG 498



FIG 499



FIG 500



FIG 501



FIG. 502



FIG. 503



FIG. 504



FIG. 505

Fig 502—NORMAL ŒSOPHAGUS

A woman of 44

Radiograph (Erect)—Right lateral view Represents the filling of a normal œsophagus. Natural constrictions at the point of crossing of the left bronchus and at cardiac orifice are well seen.

Mr O. A. Warner

Sir Edmund Spriggs

Fig 503—NORMAL STOMACH—IMMEDIATE

A man, aged 30, was of the thick set habitus

Radiograph (Erect)—The meal is wholly in the stomach. The duodenal cap is well seen. This is the "steer horn" type, the pylorus being almost the lowest point. The cardiac "gas bubble" is well seen.

Mr O. A. Warner

Sir Edmund Spriggs

Fig 504—NORMAL STOMACH— $\frac{1}{4}$ HOUR

Radiograph—This is the normal appearance a quarter of an hour after ingestion of barium. Traces of meal are visible in the duodenum and small intestine. This is the commoner form of stomach, the "fish hook" type, with the pylorus vertical and the greater curvature lowermost.

Dr L. A. Rowden

Fig 505—NORMAL STOMACH— $\frac{1}{2}$ HOUR

Half an hour after food this was the condition (same patient as Fig 504). More meal has entered the small intestine, a fluid level is seen in cardia, with gas above.

Dr L. A. Rowden

Note—In the preparation of these pictures a quantity (about 16 oz.) of barium sulphate emulsion is swallowed whilst being watched on the fluorescent screen films being exposed when anything abnormal is seen and at regular intervals. The result is in effect a cast of the hollow organ being investigated; it is essentially the contour which is revealed for study. Its great limitation is that nothing is seen in line with the shadow.



FIG. 506



FIG. 507



FIG. 508



FIG. 509



FIG. 510



FIG. 511

Figs 506-511—NORMAL OPAQUE MEAL

A healthy man of 60, who has remained so for the six years since being X-rayed

Fluoroscope—The œsophagus was normal. The tone and peristalsis of the stomach were good, all the meal having passed the stomach in five hours. No sign of ulceration or cancer. The duodenum showed no evidence of ulceration, kinking, or obstruction. The jejunum and ileum were normal. Delay in the passage of meal was observed in the colon, none having passed the splenic flexure in twenty-four hours, he refused an enema. The appendix was directed upwards along the inner border of the cæcum; it was not tender.

Fig 506 (15 minutes after ingestion of meal)—The stomach is normal in size and of the "fish hook" type. Save for commencing peristalsis, on the greater curvature, the outline is smooth. The gas bubble reveals an irregular fluid level due to secretion. A trickle of food has entered the duodenum, indicated by arrow.

Fig 507 (25 minutes after meal)—Three peristaltic waves are seen in the body of the stomach, the pylorus is contracted. The duodenal cap is clearly visible, as is the second part of the duodenum, the transverse part is obscured by a coil of jejunum, the latter being beautifully clear.

Fig 508 (35 minutes after meal)—A considerable amount of meal has left the stomach. Several waves of peristalsis are visible. The pattern of the jejunum is strikingly seen. Mixed secretions render the "level" in caecum irregular.

Fig 509 (45 minutes after meal)—The upper level of the meal presents a fluid level, above which is gas.

Fig 510 (5 hours after meal)—The meal occupies the ileum, cæcum, ascending and proximal half of the transverse colon. The smooth contour of the ileum presents quite a different picture to the pattern of the jejunum.

Fig 511 (24 hours after meal)—No meal has passed the splenic flexure.

N.B.—An opaque enema ought to be given in these cases, since a meal will pass an early cancer, whilst an enema starts a spasm, which arrests the opaque medium. The patient had refused this.

Dr W. H. ROWDEN

Mr A. P. BERTWISTLE

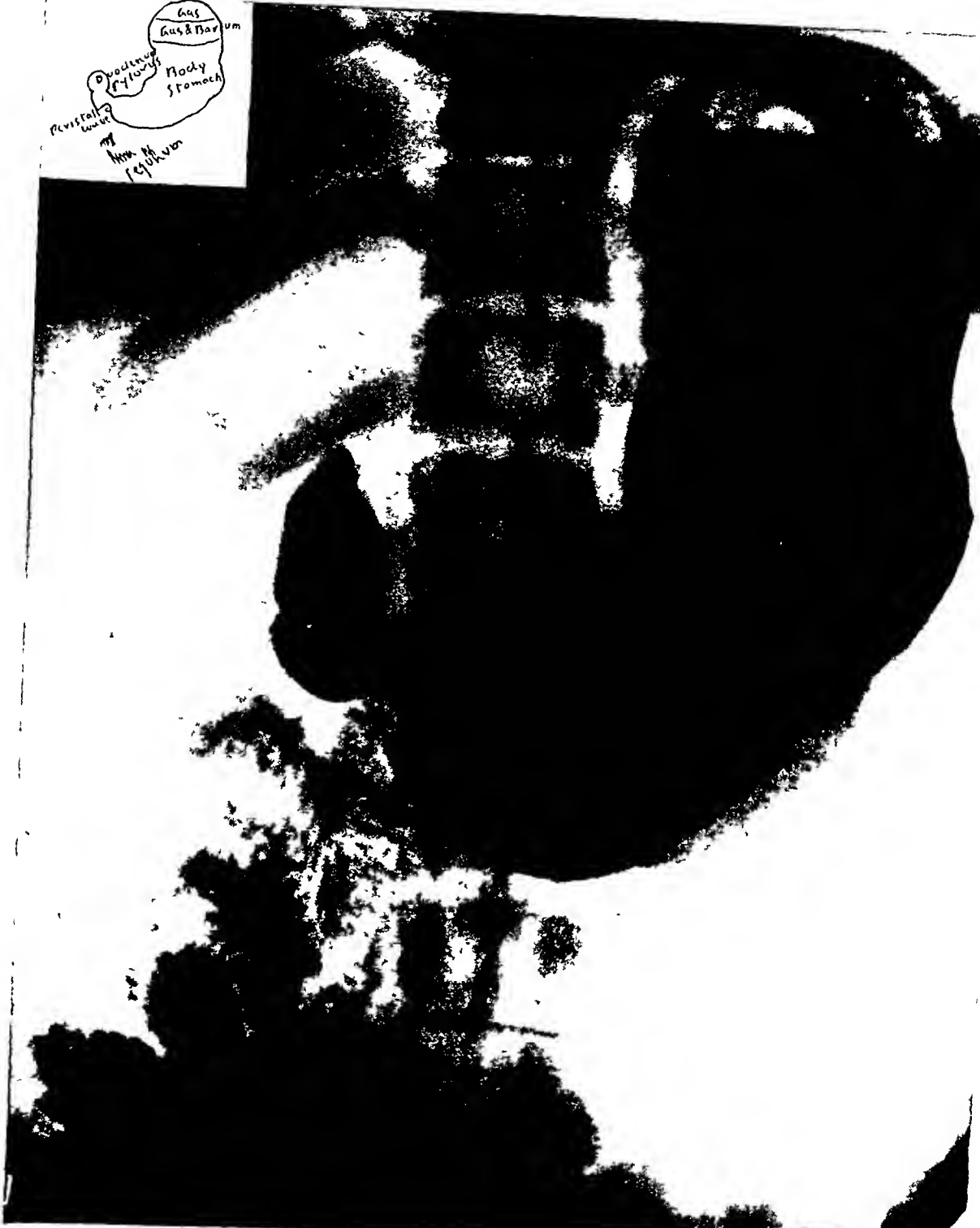


FIG. 512

Fig 512—NORMAL STOMACH AND DUODENUM—1 HOUR

Radiograph—The stomach is of the “steer horn” variety. The fundus is occupied by air, below which is a layer containing secretions and barium clinging to the wall. Then comes the body of the organ filled with barium, several peristaltic waves are visible, one particularly deep is just proximal to the pylorus, which is recognised by a slight notch on both sides. The ascending part of the duodenum and cap are clearly defined. The pattern of the jejunum is well seen.

Dr W. H. Rowntree



FIG. 513



FIG. 514



FIG. 515



FIG. 516

Fig 513—NORMAL MEAL—1 HOUR

A woman of 37

Radiograph (Prone)—The majority of the barium is in the stomach, some is seen passing into the duodenum, the course of which is readily made out, and into the jejunum. The “stepped” appearance of the duodenum is not an uncommon finding.

Mr O A MARLER

Sir EDMUND SPRIGGS

Fig 514—NORMAL STOMACH—1 HOUR

A woman of 37

Radiograph (Erect)—The cylindrical shape of the organ indicates that its musculature is holding its contents firmly. Barium is seen entering the duodenum, the valve conniventes of which are clearly visible. Peristaltic waves present, nearing the pyloric canal.

Mr O A MARLER

Sir EDMUND SPRIGGS

Fig 515—NORMAL STOMACH AND INTESTINE—2 HOURS

Radiograph—Normal appearance of an opaque meal two hours after ingestion. About half the meal remains in the stomach, which shows an incisure; the rest is in the ileum, scattered fragments being in duodenum and jejunum, the course of the former being well seen.

Dr L A ROWDEN

Fig 516—NORMAL MEAL—2½ HOURS

Radiograph (Prone)—Whilst the stomach contains some barium, the greater part has passed into the small intestine. None is present as yet in the large gut, save in the cæcum.

NB—Gall stones are visible to the right of the second lumbar vertebra.

Mr O A MARLER

Sir EDMUND SPRIGGS



FIG 517

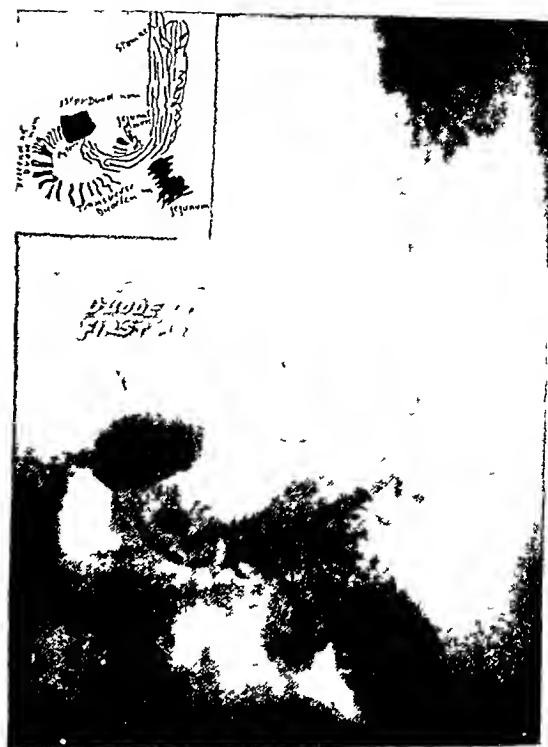


FIG 518



FIG. 519

Fig 517 and 518—NORMAL GASTRIC MUCOSA

A female, aged 58

Radiographs —Fig 517 (Erect) —Running longitudinally in the part of the stomach related to the lesser curvature are parallel folds of mucous membrane, in that part related to the greater curvature these folds give place to others of a honeycomb nature. The pyloric sphincter is about to allow the contents of the pyloric canal to enter the duodenum.

Fig 518 (Erect) —The same appearances noted above are evident. The pyloric sphincter is closed. A well shaped duodenal cap is seen, the rest of the duodenum and first part of the jejunum can be traced by the valvulae conniventes.

Dr W H ROWDEN

Fig 519—NORMAL GASTRIC MUCOSA

A male, aged 41

Radiograph (Prone) —The longitudinal bands are in evidence, but the whole picture lacks the sharpness of the erect position. Meal is present in jejunum.

Dr W H ROWDEN

NB —Figs 517-519 were taken after the ingestion of 1½ oz barium meal, whereas the usual amount is 16 oz (W H Rowden). This method has been likened very aptly to "whitewashing," contour is sacrificed to study of the mucosa. Thus it is no rival to that described for contour, merely complementary to it. Its greatest advantage is that it reveals ulcers and neoplasms of the anterior and posterior walls of the organ.

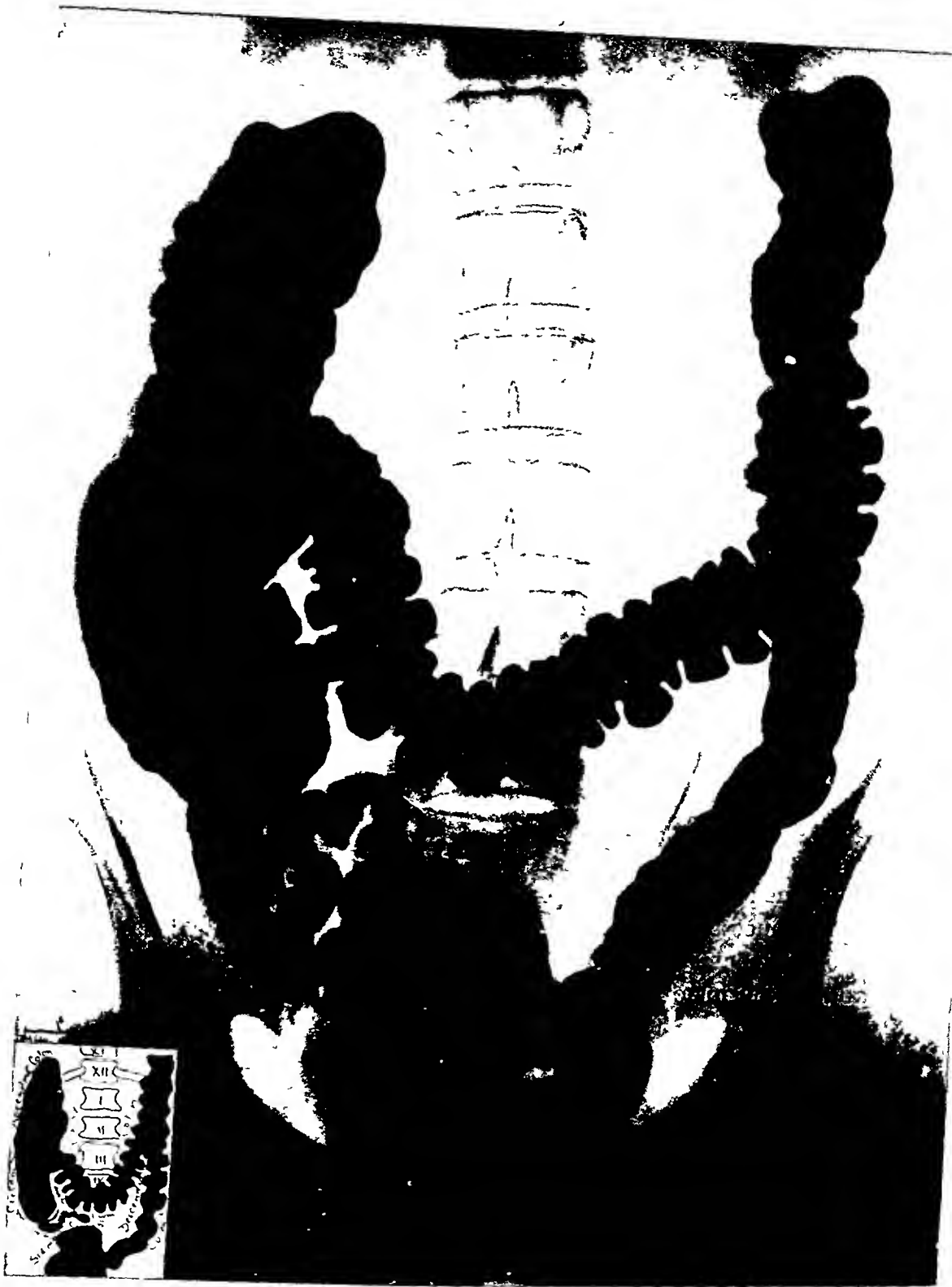


FIG. 320

Fig 520—NORMAL COLON

A woman of 59

Radiograph (Pione)—The colon and cæcum are well filled with buttermilk and barium enemata, some of which has regurgitated into the ileum, which is not pathological. The appendix is visible between the ileum and cæcum. The hepatic flexure is lower than the splenic, which is normal. Note the regular haustrations on both sides of the gut.

Mr O. A. MARKER

Sir EDMUND SPRINGS



FIG. 521



FIG. 522



FIG. 523



FIG. 524

Fig 521—NORMAL COLON

A woman of 35

Radiograph—The colon and cæcum are well filled the latter being inverted. This abnormality is found in $\frac{1}{2}$ per cent of cases, and is not pathological.

Mr O A MARXER

Sir EDMUND SPRIGGS

Fig 522—NORMAL COLON

A woman of 47

Radiograph (Prone)—The whole of the cæcum and colon are seen the low position of the left part of the transverse colon is a natural anomaly (This part of the transverse colon is superimposed on the descending colon, as is shown by the haustral segmentation being different on the two sides).

Mr O A MARXER

Sir EDMUND SPRIGGS

Fig 523—NORMAL SMALL AND LARGE INTESTINES

Appearance five hours after partaking of meal

The stomach is almost empty. The ileum, cæcum and ascending colon contain most of the meal, whilst transverse and descending colons contain fragments.

Dr I A ROWDEN

Fig 524—MASS PERISTALSIS OF COLON

The whole of the colon is filled with barium as the result of a peristaltic rush.

Two kinds of movement occur in the large intestine firstly, the antiperistaltic movement—which is not true peristalsis, since a wave of inhibition does not precede contraction—in the cæcum and ascending colon producing an anal stream and secondly, true peristalsis, which occurs at rare intervals and which starting in the cæcum sweeps everything before it until the sigmoid is reached, where the feces are stored. Such a peristaltic wave is here depicted—it happens probably two or three times a day.

Dr L A ROWDEN

Fig. 525.—PHARYNGEAL DIVERTICULUM

Clinical History.—A man, aged 58, had, for years, noticed some difficulty in swallowing. Recently it had increased, considerable quantities of food regurgitating half an hour after a meal. The patient lost weight and felt under-nourished.

Radiograph (Oblique position).—A large shadow is seen, characteristically rounded below and horizontal above, where gas is present

Operation—The pouch was dissected out and removed. The wall of the pharynx was sewn up in two layers, drainage being instituted down to the suture-line for three days. Complete recovery ensued.

Dr W J. S BYTHELL

Late Sir WM MILLIGAN

Dr A. E BARCLAY.

Fig. 526.—PHARYNGEAL DIVERTICULUM

Clinical History.—A man, aged 75, complained of nine years' difficulty in swallowing, with curious clucking noises in his throat and very copious expectoration of mucus and saliva. Latterly he had great difficulty in deglutition; there was marked loss of weight.

Radiograph (Oblique view immediately after the ingestion of 4 oz. of barium suspension. Upright).—Above the clavicle and posterior to the trachea there is a globular pouch containing barium suspension. The lower end of the pouch is round and free; superiorly it is attached by a neck to the lower end of the pharynx, just above the level of the hyoid bone cartilage.

Private Clinic

Late Sir DAVID WILKIE.

Figs. 527 and 528.—PHARYNGEAL DIVERTICULUM

A woman, 79 years old, had suffered from dysphagia for many years, being able to swallow semi-solids only, even these regurgitated.

Fig. 527 (Antero-posterior view).—A clearly defined diverticulum, rounded, save above, where a fluid level, with gas above, is visible at the level of the first rib.

F TOLLEY

Mr J LEWIS

Fig. 528 (Lateral).—A similar round shadow, with a horizontal fluid level above, is apparent; some meal has entered the œsophagus.

F TOLLEY

Mr J LEWIS



FIG 525



FIG 527

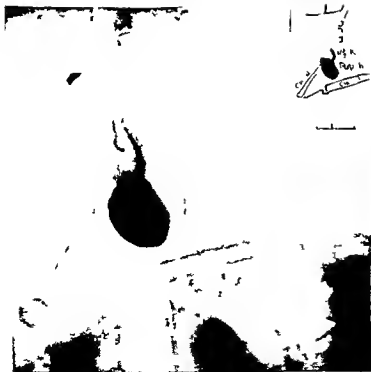


FIG 526



FIG 528

Fig. 529.—PHARYNGEAL DIVERTICULUM

Radiograph—The pouch, which is to the left of the middle line, has been filled by swallowing barium sulphate. The pressure of the filled sac, as its lumen comes more and more into line with the pharynx, causes dyspnoea and dysphagia.

Late LORD MOYNIHAN.

Fig. 530.—ŒSOPHAGEAL STRICTURE. (See Fig. 502)

Clinical History.—An undersized child of 11 who could hardly take any solid food without vomiting. He was the second child; fed on cow's milk and water, at eight weeks he began to vomit; cream and cornflour were substituted for the milk with rather better results. Solid food was attempted at one year of age, but vomiting was frequent and constipation was persistent. Both the vomiting and constipation have continued and the child has been fed on liquid and thickened food only.

Radiograph.—The œsophagus tapers off to a fine thread some distance below the level of the bifurcation of the trachea; it is somewhat dilated. Barium is present in the stomach.

Subsequent History.—Two years later there was little change.

N B.—Such strictures are rare; when they do occur it is much nearer the bifurcation of the trachea, being due to incomplete separation of these two tubes in their embryonic stage.

MR W. B. R. MONTGOMERY.

Fig. 531.—CONGENITAL ABSENCE OF LOWER ŒSOPHAGUS

Clinical History.—A baby, two days old, was sent to hospital as a pulmonary œdema owing to profuse salivation.

Radiograph.—The œsophagus is dilated in its upper part, and terminates at the point of crossing of the left bronchus, a naturally constricted part of the tube.

Subsequent History—A gastrostomy was performed, but no trace of an œsophageal opening was found. As the parents were averse to a permanent gastrostomy the stomach was closed, and the baby died.

N B—The dilatation of the upper œsophagus was doubtless due to failure of amniotic fluid, which normally enters the alimentary tract, to enter the stomach.

Late F. H. FRIER.

Dr E. HOMES WATKINS.



FIG 529

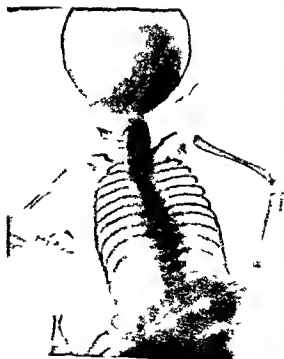


FIG 531



FIG 530

Fig. 532.—SALIVARY CALCULUS

Radiograph —A small calculus is visible in the duct of the submaxillary gland opposite the 2nd premolar

Late Mr G F STEBBING.

Late Sir CHARLES SYMONDS

Fig 533.—SALIVARY CALCULUS: OSSIFIED STYLO-HYOID LIGAMENT

Radiograph —A dense calculus is seen in the deep part of the salivary gland, superimposed on the mandible

Well-marked ossification is seen in the stylo-hyoid ligament, the hyoid and styloid sections being separated by a distinct joint

Dr L. A ROWDEN

Fig. 534.—CARDIOSPASM. (See Fig. 501)

Radiograph —The dilated, tortuous column of barium ending in a terminal spike at the level of the diaphragm is pathognomonic. It affects younger subjects than cancer, females oftener than males

Dr W. H. ROWDEN.

Fig. 535.—CARDIOSPASM. (See Fig. 501)

Clinical History —A woman of 50 had substernal pain and regurgitation of food for seven years. A year later gastrostomy was done and a tube worn for two years. A Killian tube was passed and bougies inserted up to $\frac{3}{4}$ inch in diameter without securing even a day's relief. At the time of the radiograph food caused her very severe pain at the end of the sternum, some was regurgitated three or four times during each meal

Screen —Barium emulsion passed freely to the stricture, beyond which it moved slowly, a large amount remaining after four hours

Radiograph —The œsophagus is dilated and somewhat tortuous. The lower end of the opaque column is funnel-shaped, from its termination flows a fine stream

Operation.—The obstruction was forcibly dilated by the insertion of a Plummer's rubber bag, which was inflated subsequently with water under considerable pressure. This was repeated on three occasions in the course of a fortnight.

Result —Immediate relief was followed by a gain of 28 lb in five months

X-rays then showed barium entering the stomach without hesitation, there was still dilatation though food did not accumulate

Dr N MURCH

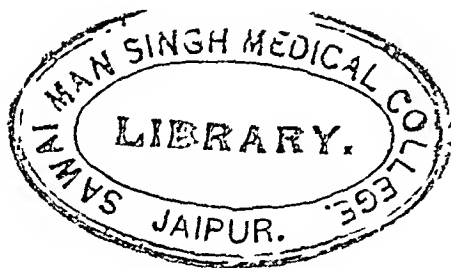




FIG 532



FIG 533



FIG 534



FIG 535

Fig. 536.—CARCINOMA ŒSOPHAGUS—INTUBATION. (See Fig. 502)

Radiograph.—A Symonds' tube has been passed into the œsophagus and an opaque meal given. The outline of the tube is visible, passing through the column of barium, which ends abruptly at the site of the growth.

Late Mr G F STEBBING

Late Sir CHARTERS SYMONDS

Fig. 537.—CARCINOMA ŒSOPHAGUS—INTUBATION. (See Fig. 502)

Radiograph.—A Symonds' tube is seen behind the heart shadow

Late Mr G F STEBBING

Late Sir CHARTERS SYMONDS

Fig. 538.—CARCINOMA ŒSOPHAGUS. (See Fig. 502)

Radiograph—The meal has been arrested at a point corresponding to the crossing of the left bronchus. Above, the œsophagus is dilated and contains gas, thus causing a fluid level.

Remarks.—This abrupt termination, if near the cardia, would have suggested cardiospasm.

Dr W. H. ROWDEN.

Fig. 539.—CARCINOMA OF ŒSOPHAGUS. (See Fig 502)

Clinical History.—A man of 62 gave a history of gradually increasing difficulty in swallowing, over a period of two months. At first the symptoms were intermittent, but later became constant, only fluid nourishment could be taken at the time of examination

Radiograph (Oblique view, upright position) —There is a stricture of the œsophagus about its middle, with slight dilatation above. Contrast the length of the obstruction with the abruptness of cardiospasm.

Private Clinic

Late Sir DAVID WILKIE.

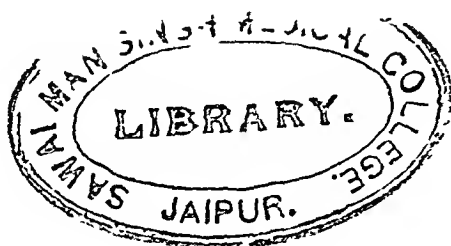




FIG 536



FIG 537



FIG 538



FIG 539

Fig. 540.—CANCER ŒSOPHAGUS. (See Fig 502)

Radiograph.—At the point of crossing of the left bronchus the œsophagus ends in a moth-eaten stenosis beyond which merely a trickle of barium passes.

Note.—This is one of the three straits in the œsophagus at which obstructions are prone to occur, the others being the commencement and the diaphragmatic opening.

Dr L. A. ROWDEN.

Fig. 541.—FOREIGN BODY IN ŒSOPHAGUS

Radiograph.—An open safety-pin is seen in the œsophagus. It was removed by operation; tearing would undoubtedly have resulted from any attempts at drawing it out with the clasp end, upwards.

Dr L. A. ROWDEN

Fig. 542.—GASTRIC ULCER. (See Fig. 512)

Clinical History.—A woman of 63 had complained of epigastric pain for many years, which had been much worse during the last three months.

Radiograph—An ulcer "bay" is seen projecting from the lesser curvature of the stomach, containing air and streaks of barium. The greater curvature is drawn up to this "bay," due probably to spasm in view of her subsequent recovery.

Subsequent History.—A test meal showed normal free acid and combined chloride curve, no occult blood was present. With careful dieting she improved rapidly and gained weight, and has since done well.

Late F. H. FRIER.

Dr E. HOLMES WATKINS.

Fig. 543.—SPASMODIC HOURGLASS STOMACH. (See Fig 512)

Radiograph (Postero-anterior).—The stomach is almost completely bisected as the result of spasm. That it was not organic was shown by its disappearance on re-examination.

(A piece of wire indicates the costal margin.)

Dr L. A. ROWDEN



FIG 540



FIG 541



FIG 542



FIG 543

Fig. 544.—GASTRIC ULCER. (See Fig. 512)

Radiograph—A well-defined ulcer is seen on the lesser curvature of the stomach. The ensuing cicatrisation has caused the development of an hourglass contraction, the greater curvature being drawn up to the ulcer site

(The wire indicates the costal margin.)

Dr L. A. ROWDEN.

Fig. 545 —GASTRIC ULCER. (See Fig 512)

Clinical History—A man of 48 had pains off and on for fifteen years. They began two or three hours after food, and were relieved by more food or by deliberate vomiting; hæmatemesis occurred twice. He had lost weight.

Screen—Some dilatation was present, but the tone was good, though peristalsis was not very active. Tenderness was present over the nodule seen on the lesser curvature. One-third of the meal remained in the stomach three hours after administration; none had then reached the cæcum. The following day all the meal had reached the colon, which was ptosed.

Radiograph—An ulcer, bearing radiating processes, is seen on the lesser curvature.

Remarks.—The tenderness indicates activity and the processes, penetration and œdema. The delayed emptying is due to spasm at the site of the ulcer and at the pylorus.

Dr L. A. ROWDEN.





Fig 544



Fig 545

Fig. 546.—GASTRIC ULCER. (See Fig. 512)

The stomach is almost bisected; merely a trickle of barium is seen connecting the two halves. Three fluid levels are visible, with air above each, viz. below the cardia, at the origin of the pyloric canal and the first part of the duodenum. An ulcer is visible on the lesser curve above the constriction. Many peristaltic waves are present.

Dr L. A. ROWDEN.



FIG. 116

Fig. 547.—GASTRIC ULCER. (See Fig. 512)

Clinical History.—A man of 60 gave a history of twelve years' pain in the upper left abdomen, coming on one to two hours after food. The symptoms, at first intermittent, had now become continuous.

Radiograph.—The crater of a gastric ulcer can be seen on the lesser curvature above the incisura angularis.

Operation.—Radiograph confirmed

Mr O A MARXER

Sir EDMUND SPRIGGS

Fig. 548 —GASTRIC ULCER. (See Fig. 512)

Clinical History.—A male, aged 43, had for three years suffered from abdominal pain of an intermittent type, associated with nausea and occasional vomiting.

Radiograph.—At the commencement of the pyloric canal is the crater of a deep ulcer containing, from below upwards, barium, secretion, and air.

Mr O A MARXER.

Sir EDMUND SPRIGGS

Figs. 549 and 550.—GASTRIC ULCER. (See Fig. 512)

Clinical History.—A man had experienced epigastric pain for many years, which had recently been aggravated. Much wind came up, but no vomit. He had always been thin.

The symptoms, formerly typical of chronic ulcer, now suggested malignant change.

Screen.—Stomach was not dilated; a large ulcer was seen on the lesser curvature. No pyloric obstruction was present, peristalsis deficient.

Radiographs.—Fig. 549.—The main barium mass lies below, some gas is seen above, and between these two is a large saucer-shaped ulcer, hourglass contraction is present.

Fig. 550 —A "fleck" of barium is seen opposite the second lumbar vertebra two and a half hours after the meal.

Dr L A. ROWDEN

N.B.—The "fleck" is an important sign of ulceration of a hollow viscus, it is the opaque content of an ulcer, left after the main mass of meal has passed on.



FIG 547



FIG 548



FIG 549



FIG 550

Fig. 551.—RECURRENT GASTRIC ULCER. (See Fig. 512)

Clinical History.—For eleven years a woman, aged 63, had indigestion and abdominal pain, coming on half an hour after food. V-resection of an ulcer had been performed three years before and, a year later, appendicectomy. On admission she was suffering from pain which occurred an hour after food, and which was relieved by alkalies.

Radiograph.—An ulcer crater is present at the stitch line of the V-section, with a deep indentation opposite. There were signs of duodenal ulceration, the distal part of the stomach retaining its contents for more than twenty-four hours.

Treatment.—Absolute rest and modified Lenhartz diet relieved the pain. At the third operation the above findings were confirmed.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS



FIG 551

Fig. 552.—GASTRIC ULCER. (See Fig. 517)

Clinical History.—A woman, aged 56. had gastric symptoms for four years.

Relief Radiograph.—A well-filled distal half of the stomach is connected with the proximal half by a mere trickle of barium in the course of which a large ulcer crater is apparent. The greater curvature has been drawn up to the site of the ulcer owing to spasm or fibrosis.

Dr W. H. ROWDEN.

Fig. 553.—GASTRIC ULCER. (See Fig. 517)

Clinical History.—A man. aged 49, complained of pain under the left costal margin, radiating to the right. The pain was relieved by taking more food. Occasional vomiting was present.

Relief Radiograph (Erect).—The stomach shows some narrowing at its middle. due to spasm or fibrosis, the result of an ulcer seen at some little distance from the main mass of barium. The typical longitudinal folds are not much in evidence, but the honeycombing is marked.

Dr W. H. ROWDEN.

UNDER
CRATER

LIC 553

LIC 512

Fig. 554.—ULCER WITH HOURGLASS STOMACH. (See Fig. 512)

Clinical History—A woman, aged 49, suffered for over thirty years from attacks of indigestion, and latterly had to exercise the greatest care in regard to both the quantity and quality of the food she took. Five weeks before examination she had a copious hæmatemesis.

Radiograph (First barium meal given four and half hours previously—a second was given immediately prior to the radiograph being taken. Upright position)—Marked hourglass contraction of the stomach. The second meal is filling the proximal sac which is connected with the distal by an attenuated line of barium, having the typical eccentric 'water-spout' origin. There was retention in the distal sac, with a narrowed and irregular duodenal vestibule. The duodenal cap was large.

Operation.—A tight hourglass contraction of the stomach and a marked stenosis of the duodenum from ulcer were found. A gastro-gastrostomy and gastro-duodenostomy were performed.

Private Clinic

Late Sir DAVID WILKIE

Fig. 555.—GASTRIC ULCER (See Fig. 512)

Clinical History—A man, aged 50, had a history of four years' epigastric pain, coming on two hours after food and relieved by taking more. He experienced nausea and salivation.

Radiograph (Right lateral. Erect)—In the hollow of the lesser curvature is seen the spike of an ulcer. Beneath the gas is a thick layer of secretion resting on the meal.

Treatment—Three months' medical treatment caused temporary improvement except for occasional heartburn. All symptoms recurred within a year. The existence of an ulcer was confirmed at operation and gastro-enterostomy performed with complete relief.

Mr O. A. MARNER

Sir EDMUND SPRIGGS

Fig. 556.—PERIGASTRITIS TUBERCULOSA. (See Fig. 512)

Clinical History—A woman of 36 suffered from phthisis and had lost 20 lb. in ten months. She had several attacks of hæmatemesis. Her appetite was poor and she was constipated. There was pain in the epigastrium independent of food. A soft movable epigastric tumour was palpable.

Screen—Stomach dilated, peristalsis feeble, in the body of the organ was a filling defect. The lungs showed cavitation.

Radiograph (P. A.)—The stomach outline is markedly irregular. The outline of the intestines is visible, indicating that the irregularity is due to adherent bowel.

Dr KARL HILMAN

Fig. 557.—GASTRIC PAPILLOMATOSIS. (See Fig. 512)

Clinical History—A man, aged 44, gave a history of indigestion and pain—never of a severe character—which came on two hours after food, and were relieved by taking more. He had no vomiting or hæmatemesis, and his weight was constant.

Radiograph—Above is seen a deformed air bubble, the rest of the organ is unrecognisable being grossly distorted by filling defects.

Operation—Though the pyloric part of the stomach looked normal, palpation revealed a soft worm-like mass which slipped about under the fingers. On opening the organ the characteristic appearance of papillomatosis was evident.

Note—It is only now becoming realised that as many as 2 per cent. of tumours of the stomach are simple. Many would have considered this case inoperable, the failure to lose weight is an important diagnostic sign of a simple tumour.

Private Clinic

Late Sir DAVID WILKIE



FIG 554



FIG 555



FIG 556



FIG 557

Fig. 558.—GASTRIC CARCINOMA. (See Fig. 512)

Radiograph (Immediate).—A small “steer-horn” stomach with a deformed gas bubble, a well-defined filling defect on the greater curvature is apparent. The latter occupies the body chiefly and gives the organ an hourglass form.

The “filling defect” is the most characteristic feature of cancer of a hollow viscus. It may be likened to the shadow cast by a soft tennis ball indented by a test tube, the tennis ball representing the hollow organ, the test tube the growth.

MR O A MARNER

SIR EDMUND SPRIGGS

Fig. 559 —CARCINOMATOUS GASTRIC ULCER. (See Fig. 512)

Radiograph.—A small stomach presenting a filling defect of the body in the centre of which is a circular fleck due to ulcer formation. The cancer may have preceded the ulcer or have developed subsequently. Whether ulcer predisposes to cancer is a heated point of controversy.

DR W H ROWDEN

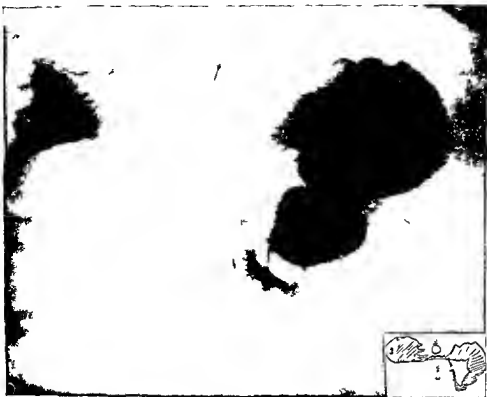


Fig 539

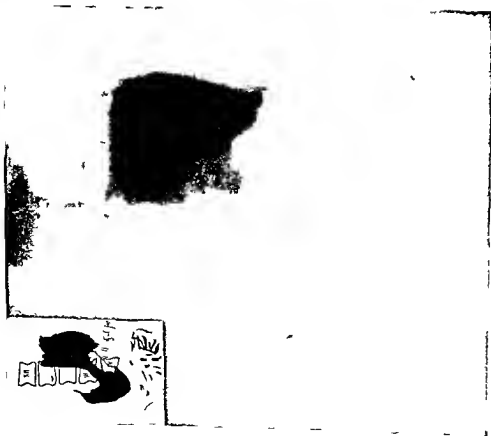


Fig 538

Fig. 560.—GASTRIC CARCINOMA. (See Fig. 517)

Clinical History.—A man, aged 52, gave a history of loss of appetite and of weight; recently he had constant vomiting.

Relief Radiograph (Erect).—The stomach is small—this in itself is suggestive of carcinoma in the presence of vomiting. A mere trace of meal is present in the proximal three-quarters of the organ. At the extreme top of the fundus are seen typical longitudinal folds, but at the point of the uppermost arrow they disappear, leaving a uniform space of slight density, save for the presence of some honeycombing on the greater curvature. The lower arrow indicates the lowermost part of the neoplasm.

Dr W. H. ROWDEN



FIG 560

Fig. 561.—GASTRIC CANCER. (See Fig 512)

Radiograph.—The pyloric canal is the seat of a filling defect due to tumour formation. Some of the meal has passed into the duodenum, but most is held up in the body, which is small and of the steer-horn type

Dr L. A. ROWDEN

Fig. 562.—MALIGNANT GASTRIC POLYPUS IN YOUNG SUBJECT. (See Fig 512)

Clinical History —A girl, aged 11, gave a history of weakness and of feeling tired for the last six months. She had indigestion and her appetite was poor. There was pain round the umbilicus, accompanied by nausea and at times actual vomiting. She was anæmic and had lost weight. Peristaltic waves were seen passing from left to right, sometimes producing a swelling in the epigastrium.

Radiograph.—Occupying the pyloric part of the stomach is seen a large filling defect, smooth and almost circular in outline. Seen through this defect is the duodenum.

Operation.—A large neoplasm in the pyloric region of the stomach was resected, together with the prepyloric and lesser curve lymphatic glands.

Pathological Report —This confirmed the adeno-carcinomatous nature of the growth; the glands were found to be merely inflammatory

Result.—Patient was well two and three-quarter years after operation.

Private Clinic.

Late Sir DAVID WILKIE



FIG 562

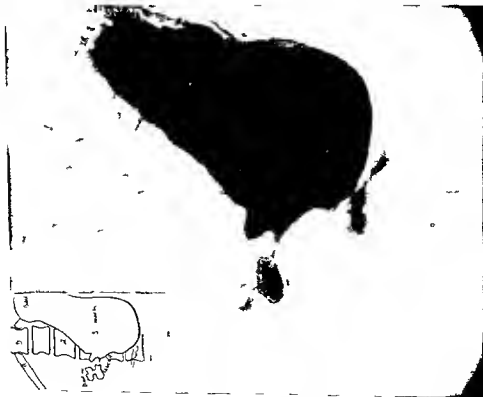


FIG 561

Figs. 563 and 564.—CARCINOMA OF THE CARDIA. (See Figs. 511 and 512)

Clinical History.—A man, aged 61, had always enjoyed robust health until three months before examination. During this time he suffered from progressively increasing flatulence with, firstly, occasional, and then constant, difficulty in swallowing solid articles of food. During the month before examination there had been very definite loss of weight and of general strength. No tumour was palpable.

Radiographs.—Fig. 563 (Oblique view immediately after the barium meal. Upright position).—There is a definite obstruction at the lower end of the œsophagus, eccentric and situated just above the dome of the diaphragm. Below this there is a filling defect in the form of a "crab claw" at the cardiac end of the stomach.

Fig. 564 (Upright position. Antero-posterior view).—There is a large gas bubble in the cardiac end of the stomach, causing eventration of the diaphragm, with a fungating tumour on its medial aspect, outlined by the gas and covered with a layer of barium. Distal to this the body of the stomach is extremely narrowed above the pyloric antrum and the pylorus are normal, but deviate well to the right.

Operation.—A large growth was found involving the cardiac end of the stomach and surrounding the œsophageal opening. A gastrostomy was performed.

Private Clinic.

Late Sir DAVID WILKIE.

Figs. 565 and 566.—GASTRIC CARCINOMA. (See Fig. 512)

Clinical History.—For over six months a woman of 61 had suffered from progressive loss of appetite, flatulence and loss of general strength and energy. For a few weeks she had been troubled with pain coming on independently of meals and associated with vomiting: no tumour was palpable. There was a history suggestive of gastric ulcer twenty years previously.

Radiographs.—Fig. 565 (First barium meal four hours previously: second, immediately before. Upright position).—Malignant hourglass stomach with a very small normal proximal sac and pyloric canal. A very extensive filling defect of the barium content in the body of the stomach is seen, especially in the greater curvature. The distal sac formed by the distal portion of the body, the pyloric antrum and the pylorus shows no deformity. The duodenal cap is rather large, but regular, and the second and third parts of the duodenum are well seen.

Fig. 566 (One and a half hours later. Upright position).—The upper sac has only partially emptied, demonstrating the very definite obstruction caused by the tumour's growth. A saucer-shaped residue is seen in the pyloric end of the stomach and a similar one in the first part of the duodenum.

Operation.—A malignant mass, involving the body of the stomach and forming a very definite hourglass constriction, was found, and subtotal gastrectomy performed.

Private Clinic.

Late Sir DAVID WILKIE.



FIG 563



FIG 564



FIG 565



FIG 566

Fig. 567.—GASTRIC CARCINOMA. (See Fig. 512)

Radiograph.—The stomach, of the “fish-hook” variety, presents a filling defect close to the pylorus. The outline of the organ is grossly irregular due to spasm, disorderly peristalsis and possibly anti-peristalsis. Possibly the cancer involves more than the filling defect, thus accounting for its coming almost to a point.

Figs. 568-570.—GASTRIC CARCINOMA AND SIMPLE ULCER. (See Fig. 512)

Radiograph.—The pyloric canal is the seat of an extensive filling defect. Proximal to this is the bay of a simple gastric ulcer on the lesser curvature.

The most important diagnostic feature of organic disease of the alimentary canal is the finding of certain deformities which are persistently present. These three radiographs, taken at thirty seconds' intervals, are almost identical, proving the malignant nature of the lesion, a cancerous stomach being lazy in its function.

Dr L. A. ROWDEN



FIG 567

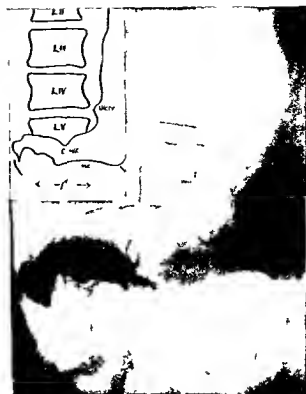


FIG 568



FIG 569



FIG 570

Fig. 571.—CARCINOMA CARDIA. (See Fig. 512)

Clinical History—A man, aged 59, had difficulty in swallowing solid food for three months, and had lost two stones in consequence. The symptoms were those of carcinoma of the œsophagus.

Screen—The meal was delayed at the lower end of the œsophagus. The gastric fundus did not fill. There was no delay in the exit of food from the stomach.

Radiograph—Shows a filling defect of the cardia. A peristaltic wave separates the two lower portions of meal. Above each mass of barium is a fluid level and gas.

Dr L. A. ROWDEN

Fig. 572.—GASTRIC CARCINOMA. (See Fig. 512)

Screen—The cardiac stomach was not dilated, its outline was regular. Except at times peristalsis was not active, the waves being arrested near the pylorus. The pylorus was free, dropping when patient assumed an erect position. A well-marked filling defect was seen in the pyloric canal. In four hours food had reached the cæcum, and in two more the stomach was empty and the cæcum well filled. The following day all was in the colon.

Radiograph—The stomach is seen as far as the vertebral column, the duodenum is apparent, between these is a filling defect.

Operation—Diagnosis confirmed. Patient died of hæmorrhage.

Remarks—Thus might have been a suitable case for removal as the growth was free of adhesions, as evidenced by its dropping, noted above.

Dr L. A. ROWDEN

Fig. 573.—GASTRIC CARCINOMA. (See Fig. 512)

Clinical History—A woman, aged 54, had been subject to vomiting for a month and had lost weight.

Screen—A filling defect was visible in the pyloric canal.

Radiograph—The œsophagus and a "fish-hook" stomach are revealed, the presence of meal in the former is indicative of obstruction. Two peristaltic waves are in progress. The pyloric canal is occupied by cancer, causing a filling defect. Whilst its cap is normal the rest of the duodenum is distended, doubtless due to pressure of the pyloric growth. The absence of dilatation in the presence of obstruction is almost pathognomonic of cancer. (L. A. Rowden)

N.B.—Calcification of the tips of the costal cartilages, seen on the right side, may mimic gall or renal stones.

Operation—An inoperable cancer was found.

Dr L. A. ROWDEN.

Fig. 574.—GASTRIC CARCINOMA. (See Fig. 512)

Clinical History—A man of 71 with no previous history of dyspepsia complained of acid eructations and a sense of weight in the epigastrium. He had lost fourteen pounds in a month. Palpation revealed a tumour under the left rectus above the umbilicus. The tumour was diagnosed as a gastric cancer either primary or the result of spread from the colon.

Screen—Stomach small, could not be distended. A well-defined filling defect seen at the pylorus, which was movable. Inesura noted.

Radiograph—The pyloric canal is the seat of an ulcerating growth causing a filling defect, in the middle of which is a fleck. Two claw-like processes encase the proximal part of the growth. Two peristaltic waves are present in a large organ.

Dr L. A. ROWDEN



FIG 571



FIG 572



FIG 573



FIG 574

Fig. 575.—PYLORIC CARCINOMA. (See Fig. 512)

Clinical History—One year previously a woman, aged 41, had been operated upon for malignant growth of left ovary. For three months now she has suffered persistent pain in epigastrium, loss of appetite, loss of weight and occasional vomiting. A mass was palpable in the epigastric region to the left of the mid-line.

Radiograph (Upright, four hours after a barium meal)—Demonstrates gastric and duodenal residues. The pyloric antrum and pylorus are very deformed and fill irregularly, due to the encroachment of the tumour upon the lumen. The tumour ends abruptly at the duodenum, which presents a flattened and rectangular cap. The main mass of the meal is in the coils of small intestine.

Operation—The mass proved to be a carcinoma involving the pyloric end of the stomach. A partial gastrectomy was successfully performed.

Private Clinic

Late Sir DAVID WILSON.

Fig. 576.—“LEATHER-BOTTLE” STOMACH. (See Fig. 512)

Clinical History—A man, aged 60, complained of persistent vomiting for a period of six weeks, associated with great loss of weight and strength. He denied all previous digestive trouble, but admitted that he had been losing weight over a period of three or four months.

Radiograph—Typical appearance of a small faint tubular stomach, situated high in the abdomen, emptying extremely rapidly and not varying in position with change of attitude of the body. The faint tubular outline, sloping downward to the right to a dependent well of barium in the first part of duodenum, is typical of the condition.

Operation—The stomach was infiltrated throughout, small, firm and of typical leather-bottle consistence. Total gastrectomy was performed.

Private Clinic.

Late Sir DAVID WILSON.

Fig. 577.—GASTRIC CARCINOMA. (See Fig. 512)

Clinical History—A woman, aged 65, had experienced indigestion and a sinking feeling—which had lasted nine months—two hours after each meal. She had vomited occasionally; much wind was brought up. Latterly there had been disinclination for food, and she had lost three stones in weight, and was constipated.

Screen—The pyloric stomach was tubular and refused to distend, each addition of meal simply overflowing into the duodenum. It emptied in two hours.

Radiograph ($\frac{1}{2}$ hour)—Shows a normal fundus but a narrowed tubular pyloric canal and patent pylorus.

Operation—Inoperable carcinoma was found, death occurred three months later.

Dr L. A. ROWDEN.

Late Mr L. R. BRAITHWAITE.

Fig. 578.—MESENTERIC CYST. (See Fig. 512)

A male of 62

Screen—Stomach horizontal in position. The middle portion was held up by a tumour lying beneath it. The organ emptied in four hours, barium reaching the caecum in six.

Radiograph—The stomach contains opaque meal with a long horizontal fluid level above which is gas. The greater curvature shows a large regular indentation.

Remarks—This indentation was probably caused by a cyst of the mesentery or pancreas. Unfortunately there were no confirmatory notes.

Dr L. A. ROWDEN.



FIG 575



FIG 576



FIG 577



FIG 578

Figs. 579 and 580.—CONGENITAL PYLORIC STENOSIS

Clinical History.—This was a full-term child, weighing nine pounds, who put on one pound in ten days, when vomiting began; this increased in spite of changes in diet. On admission he weighed eight pounds, the vomiting was projectile, there was marked constipation. Peristalsis was visible; there was a suggestion of a tumour on palpation.

Screen.—No peristalsis seen, no meal passed in six hours

Radiographs (P.A.).—Are almost identical, though taken at an interval of six hours. The barium lies as a mass close to the pylorus

Operation.—Gas and oxygen anaesthesia and novocain were employed. A hard, thickened pylorus was found and the Ramsted operation performed. The following day tetany developed, so parathyroid, $\frac{1}{40}$ gr., calcium lactate, 5 gr., and chloretone, $\frac{1}{2}$ gr., were given per rectum. He gradually improved, but the stools were green for several days.

Result.—Three weeks after operation he had put on one pound in weight and has progressed steadily during the subsequent eight months.

Dr A. C FOWLER.

Mr A MITCHELL.

Figs. 581 and 582.—CONGENITAL PYLORIC SPASM

Clinical History.—A boy, who weighed eight pounds at birth, was bottle-fed Vomiting, soon becoming projectile, appeared shortly and he lost weight. Peristalsis was visible but no tumour palpable. There was some food residue in the stools.

Radiographs (At 3 weeks).—Fig. 581 (Immediate).—Merely a trickle of barium is leaving the stomach.

Fig. 582 (8 hours later).—A large stomach residue is present; the “head” of the meal has reached the splenic flexure.

Subsequent History—In view of the incomplete obstruction the case was treated medically. Symptoms gradually subsided, so that in a month he had gained three ounces. Improvement was such that, three months later, X-rays showed no abnormality, and in six months he was of normal weight.



FIG 579

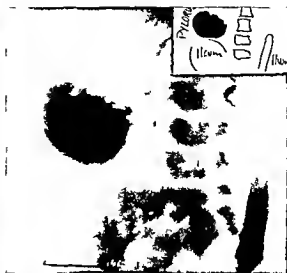


FIG 580



FIG 581



FIG 582

Figs. 583-586.—PYLORIC SPASM

Clinical History.—A baby, aged six weeks, had profuse vomiting, accompanied by green stools, for a week. It was emaciated and in very poor condition.

Radiograph.—Fig. 583 (Immediate).—The stomach has filled with opaque meal.

Fig. 584 (2 hours later).—A mere trickle of meal is present in the small intestine.

Fig. 585 (8 hours later).—Some meal has passed into the small intestine and cæcum.

Fig. 586 (24 hours later).—There is little diminution in the stomach content.

After-History.—In spite of the fact that stenosis was not absolute a Ramsted operation was decided on. The baby died several days later.

Late F H FRIER.

Dr E HOLMES WATKINS.

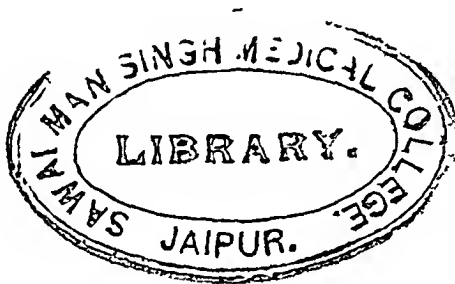




FIG 583



FIG 584



FIG 585

2c



FIG 586

Fig. 587.—DUODENAL ULCER

Clinical History.—The patient, a surgeon aged 47, had typical symptoms of duodenal ulceration.

Screen.—Stomach small and hypertonic, with well-marked peristaltic waves, emptying in one hour. An ulcer crater was apparent in the duodenum; pressure on it caused pain. No disease elsewhere. In five hours all the food was in the cæcum and transverse colon, which was not ptosed. The appendix was not visible; no tenderness over its site

Radiograph (5 hours later).—Shows the meal to have passed into the large intestine. A perfect ulcer crater in the form of a fleck is apparent in the duodenum, implying penetration. The large intestine is filled with barium

Operation.—A duodenal ulcer was found and gastro-enterostomy performed with success.

Dr L. A. ROWDEN.

Late Lord MORRIS



FIG 587

Fig. 588.—DUODENAL ULCER. (See Fig. 512)

History—A man, aged 38, suffered abdominal pain for some years, with periods of intermission. The pain occurred at any time, and was sometimes relieved by taking more food or by lying on the right side. He was anæmic and losing weight. His appendix had been removed without curing his pain.

Screen—The stomach was dilated and peristalsis irregular, at times it was very active. Organic pyloric obstruction was shown by the fact that after three hours half the food remained in the stomach. The first part of the duodenum was adherent to the liver.

Radiograph—Most of the food appears in the stomach, which is dilated. The pyloric canal and the duodenum are comparatively empty. The latter can be identified as far as its third part.

Diagnosis—The diagnosis of a relapsing ulcer of the duodenum with pyloric obstruction was confirmed by operation, as was the hepatic adhesion. The ulcer was a large one on the anterior surface.

Dr W. H. ROWDEN.

Late Mr J. BASIL HALL.

Fig. 589.—DUODENAL ILEUS. (See Fig. 512)

Clinical History—A woman suffered violent epigastric pains which left her tender.

Screen—The stomach was normal, meal soon reaching the jejunum. Some barium collected near the gall-bladder, in three hours the head had reached the descending colon.

Radiograph—The stomach appears to be normal but the duodenum is grossly dilated with gas, there are two fluid levels, with secretions and gas above.

Dr L. A. ROWDEN.

Late Mr L. A. BRAITHWAITE.

Fig. 590.—DUODENAL ULCER. (See Fig. 512)

Clinical History—For ten years this woman of 68 had ill-defined intermittent pains in the right upper abdomen, coming on two hours after meals. Latterly they had been more severe.

Radiograph—A fleck of barium on the inner side of the duodenum indicates an ulcer on its posterior surface.

Operation—While under treatment the patient had a severe hæmorrhage, from which she rallied slowly. This was repeated, and when she was operated upon a duodenal ulcer was found and gastro-enterostomy done, with cessation of symptoms.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS.

Fig. 591.—DISTORTION OF DUODENUM. (See Fig. 512)

Radiograph—The duodenal cap is distorted by the pressure of an enlarged gall-bladder. The jejunum is well seen.

Dr L. A. ROWDEN.



FIG. 588



FIG. 589



FIG. 590



FIG. 591

Fig. 592.—DUODENAL ULCER. (See Fig 512)

Clinical History.—For ten years the patient, a female aged 66, suffered from attacks of pain and discomfort after food, recurring at intervals. On admission she had pain in the epigastrium, which ascended to the chest, sometimes radiating to the left shoulder. It was worse late in the afternoon and at bedtime.

Screen.—Continuous spasm of the duodenum was present; there was irregularity of its mesial border just beyond the pylorus.

Radiograph.—Note the irregularity of contour of the duodenum due to spasm. Two minute gall-stones are visible.

Operation.—A duodenal ulcer adherent to the pancreas was found and gastro-enterostomy performed. The gall-bladder was removed, it contained five small calculi. Complete relief resulted.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS

Fig. 593.—DUODENAL ULCER. (See Fig. 512)

Clinical History.—A woman, aged 32, had intermittent attacks of pain after her midday meal, for a period of ten years. Appendicectomy had afforded no relief.

Radiograph —The mesial border of the duodenum, close to the pylorus, presents an irregularity which the screen had shown to be fixed. The diagnosis of a duodenal ulcer with adhesions was made.

Operation.—X-ray findings were confirmed and gastro-enterostomy performed, with relief of symptoms.

Mr O. A. MARXER.

Sir EDMUND SPRIGGS



FIG 592



FIG 593

Fig. 594.—JEJUNAL ULCER: DUODENAL ILEUS (See Fig 512)

Clinical History—A man, aged 35, had a gastro-enterostomy performed when 21 years old, for two years he was free from symptoms. Four years after operation he was found to have anterior and posterior ulcers at the site of the anastomosis. The jejunum was resected and the gastric stoma closed and a gastro-duodenostomy performed, with relief of symptoms for one year. X-rays then revealed a stomal ulcer at the site of the last anastomosis, which was confirmed at operation, which consisted of a gastro-enterostomy with narrowing of the anterior loop. Symptoms recurred.

Radiograph—A well-marked jejunal ulcer is present. The duodenum is distended and contains much gas and meal.

Operation—A deep jejunal ulcer was found. The jejunal loop in which the ulcer lay, together with three-fifths of the stomach, were resected. The remainder of the stomach was then anastomosed to the jejunum.

N B—Such cases are fortunately infrequent, the jejunum appearing to be quite unable to withstand contact with the chyme. In such cases the only hope of a cure lies in gastrectomy.

Private Clinic.

Late Sir DAVID WILKIE

Figs. 595-597.—GASTRIC ULCER, CHRONIC (See Fig 512)

Clinical History.—A medical man, aged 71, had, for some six weeks, experienced a slight distaste for food, particularly towards red meat, mild indigestion was present. During the last two weeks there was occasional regurgitation of food taken two or three days previously, no blood appeared, he had lost twelve pounds in weight, and was thin. He was in good health, apart from a little bronchitis and prostatic derangement. Abdominal examination revealed no tenderness or rigidity, but a tumour in the epigastrium and a suggestion of enlargement of the left lobe of the liver. A fractional test-meal showed absence of free acid and of bile, urine was normal. The only good feature was the patient's retention of an interest in life.

Fig 595 (Immediate)—A well-defined filling defect occupies the pyloric canal, it is indistinguishable from carcinoma.

Fig 596 (15 minutes later)—This bears a strong resemblance to the immediate radiograph, showing that the stomach is lazy, a well-recognised sign of cancer.

Operation—Under pentothal, gas and oxygen and cyclopiopane the abdomen was opened, to reveal a mass in the pylorus, free from adhesions, with a small gland in the lesser omentum. Partial gastrectomy was performed and the patient never looked back.

Fig 597 *Specimen*—An ulcer two inches in diameter, with ill-defined edges, encircled the pyloric canal. The ulcer floor was composed of necrotic material and granulation tissue, there was much fibrous tissue proliferation, it was simple. The gland discovered showed only fibrosis.

After-History.—Five months after the operation the patient is remarkably active, but complains that he has had to forgo cold baths and cannot walk more than three miles!

Note—This was undoubtedly a case which would have developed malignancy, the early occurrence of pyloric obstruction is a blessing, since it enables the case to be dealt with early before the condition has "taken root," so to speak.

N B—Well-marked changes in the lumbar spine, indicative of osteo-arthritis, are seen, the patient was subject to rheumatism.

Dr C. F. CONSTANT.

Mr L. E. C. NORBURY



FIG 594



FIG 595



FIG 596

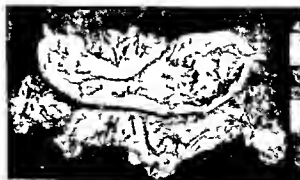


FIG 597

Fig. 598.—GASTRO-ENTEROSTOMY FOR DUODENAL ULCER

Clinical History—Six months previously a man aged 40 was operated upon for duodenal ulcer with marked dilatation of the stomach. A posterior vertical gastro-enterostomy with a lateral anastomosis between the two loops was carried out.

Radiograph (Upright, 1½ hours after second barium meal, 6 hours after first—stomach empty when examined 4½ hours after first)—One-third of the meal is still in the stomach, which is low, with a narrow pylorus running into an irregular comma-shaped duodenal cap. The jejunal loop is seen filling through the gastro-enterostomy stoma, which is close to the pyloric antrum, small but quite regular. The six-hour meal has reached the proximal end of the transverse colon.

Private Clinic.

Late Sir DAVID WILKIE.

Fig. 599.—DUODENAL ILEUS

Clinical History—A girl aged 12 suffered from severe attacks of vomiting.

Radiograph—Note the marked distension of the duodenum, which is due above to gas and below to opaque meal. As many as five fluid levels can be counted.

N.B.—The finding of fluid levels is common in intestinal obstruction in adults, but is not unusual, without causing symptoms, in children.

Nottingham General Hospital.

Fig. 600.—GASTRO-ENTEROSTOMY

Clinical History—Gastro-enterostomy was performed nine years previously, with complete relief until recently, when the old symptoms returned. The man experienced hunger-pain coming on one or two hours after food, which was assuaged by more food. The pain was chiefly epigastric, but radiated to the back also, and was relieved by the passage of flatus.

Screen—Stomach not enlarged and tone good, though no peristalsis was observed. The organ emptied in three hours, by which time some barium had reached the caecum.

Radiograph—The main mass of barium lies in the stomach, merely a trickle appears issuing through the artificial opening to the intestine.

Dr L. A. ROWDEN.

Late Mr H. LITTLEWOOD.

Fig. 601.—GASTRO-ENTEROSTOMY

Clinical History.—The operation was performed on a man, 53 years old, ten years before, but symptoms persisted. The pain awakened him regularly at 3 A.M. He suffered greatly from flatulence and had lost weight.

Screen.—The stomach was small, rapid emptying took place through the anastomosis, no food passing by way of the duodenum. No tenderness over the site of the anastomosis. There was no evidence of jejunal ulcer.

Radiograph (5 minutes after meal)—The cardia is distended with gas, little of the meal remains in the body of the organ, quantities have entered the jejunum, none has passed the natural way. The anastomotic stoma is well seen.

Dr L. A. ROWDEN.



FIG 598



FIG 599



FIG 600



FIG 601

Fig. 602.—GASTRECTOMY. (See Fig. 512)

Radiograph —The distal half of the stomach has been resected and half the cut edge sewn up, the other half being anastomosed to the jejunum. the valvulæ conniventes of which are strikingly evident.

Mr O A MARXER.

Sir EDMUND SPRIGGS.

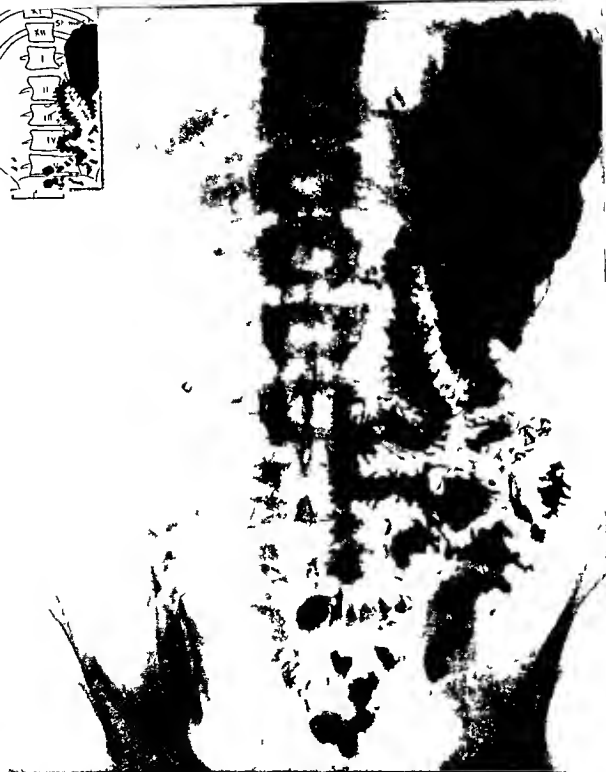


FIG 602

Figs. 603 and 604.—JEJUNAL ULCER. (See Fig. 512)

Clinical History.—A man, aged 47, had a duodenal ulcer for which a posterior gastro-enterostomy was performed four years previously. Several times during the last two years he had hæmatemesis and melæna, and suffered from continuous indigestion and epigastric pain, coming on two to four hours after food and associated with flatulence.

Screen.—During filling the meal was seen to rise in the proximal loop to the level of the duodeno-jejunal flexure before entering the distal limb of the jejunum.

Radiographs.—Fig 603 ($\frac{1}{2}$ hour after meal—prone).—Shows the high position of the stoma with a large jejunal ulcer about one inch from it. There is pyloric obstruction.

Fig. 604 (12 hours later—supine).—Barium has lodged in a fleck just above the colon, the outline of which is irregular, pointing to adhesions.

Operation.—A jejunal ulcer was found, burrowing into the transverse mesocolon, threatening to form a jejuno-colic fistula. The old anastomosis was resected, the openings closed and a gastro-duodenostomy was performed, with complete relief of symptoms; improved nutrition followed.

Remarks.—The residue in the ulcer and the irregularity of the colon are pathognomonic of penetration, a gastro-colic fistula is threatened.

MR O. A. MARXER.

SIR EDMUND SPRIGGS.

Fig. 605.—JEJUNAL OBSTRUCTION. (See Fig. 512)

Radiograph.—The stomach is partly filled by barium and the first part of the duodenum occupied by air. The jejunum—usually readily recognised by the valvulæ conniventes—is greatly distended and is uniformly opaque.

DR L. A. ROWDEN.

Fig. 606.—PERFORATED DUODENAL ULCER. (See Fig. 512)

A duodenal ulcer had just perforated.

Radiograph.—Two radiolucencies appear, the lungs above and subphrenic gas below, separated by a shelf-like structure, the diaphragm, between. The right leaf of the diaphragm is higher than the left, as it is with subphrenic abscess, in which condition gas may also be present; it is often accompanied by a pleural effusion.

N.B.—The position of gas in the abdomen is now being used to diagnose the position of obstructions. The commonest cause of gas is a laparotomy.

DR T. I. CANDY.



FIG 603



FIG 604



FIG 605



FIG 606



FIG 607



FIG 608



FIG 609



FIG 610

Fig. 607.—DUODENAL DIVERTICULUM. (See Fig. 512)

Clinical History—A woman of 66 had epigastric discomfort for eight months, which came on an hour after food and at night. There was flatulence and vomiting of bile in the morning.

Radiograph—A diverticulum bearing three tongue-shaped processes is seen projecting from the second part of the duodenum. It was tender on pressure and appeared to lie in the pancreas. The stomach is active. Note peristalsis.

Results—The symptoms disappeared under general treatment.

MR O A MARXER

SIR EDMUND SPRIGGS

Fig. 608.—DUODENAL ILEUS. (See Fig. 512)

Clinical History.—A woman of 29 had typhoid at the age of 20; appendicectomy was done five years later. A year after operation she vomited three daily for three months; the vomiting had no relation to food. She had improved since then, but her appetite was poor; she often ran a temperature of 99° F. Recently she had felt swelling and rigidity to the left of the umbilicus, and a dragging sensation in the left groin associated with nausea.

Radiograph.—The duodenum, as far as its third part, is dilated with gas. In front of the second lumbar body is a constriction. The stomach had not emptied itself nine hours after the meal.

Operation.—Duodenal dilatation was confirmed, and found to be due to pressure of the superior mesenteric vessels. Other organs were healthy. Gastro-enterostomy was performed, with complete relief of symptoms.

MR O A MARXER

SIR EDMUND SPRIGGS

Figs. 609 and 610.—GALL-STONES

Clinical History.—A woman of 46 had typhoid twenty years ago and diphtheria five years later, since when fibrositis had developed in the limbs and back. There had been four severe attacks of pain in the right upper abdomen which ensued after food and were not accompanied by vomiting. There was achylia gastrica.

Radiographs—Fig. 609 (Supine—anterior view).—A row of stones is seen lying along the twelfth rib.

Fig. 610 (Prone—posterior view).—The row of stones has curled up in the fundus.

MR O A MARXER

SIR EDMUND SPRIGGS



FIG 607



FIG 608



FIG 609



FIG 610

Fig. 617.—GALL-STONES. (See Fig. 495)

Clinical History.—A male of 55 complained of epigastric pain coming on two hours after food of any kind. It was of a colicky nature, and was not relieved by more food and had been worse during the past few years

Screen—Stomach and duodenum normal.

Radiograph.—The opaque meal is in the cæcum and colon. Above and to the left of the hepatic flexure are two gall-stones, the larger in the bladder, the smaller—showing the pathognomonic “wedding-ring” appearance—in the cystic duct.

Dr L A ROWDEN

Fig. 618.—GALL-STONES

Radiograph.—Five typical “wedding-ring” calculi are apparent in the angle between the last rib and the vertebral column, the commonest site.

Dr W. H. ROWDEN.

Fig. 619.—GALL-STONES

Clinical History.—Seven years previously a woman, aged 67, had pain in the right hypochondrium, with indigestion. Four years later an attack was associated with pyrexia. For the last three years she had indigestion, which was worse at night, and obstinate constipation. She had mitral regurgitation.

Radiograph (Supine—postero-anterior).—A collection of about eighteen gall-stones is seen opposite the second and third lumbar vertebræ

Mr O A MARXER.

Sir EDMUND SPRIGGS

Fig. 620.—GALL-STONES

Radiograph.—A large collection of small calculi, packed closely together into the shape of the gall-bladder, is visible.

Dr W H ROWDEN



FIG 617



FIG 618



FIG 619



FIG 620

Fig. 621.—GALL-STONES. (See Fig. 512)

Radiograph.—Three “wedding-ring” stones are visible close to the duodenal cap, which shows evidence of cicatrization

N.B.—Such stones might easily ulcerate into the duodenum and become lodged in the ileum, causing intestinal obstruction.

Dr O. L. RHYS.

Fig. 622.—GALL-STONES. (See Fig. 512)

Radiograph.—The duodenal cap is seen to be indented in semilunar fashion by a distended gall-bladder, in which many calculi are present.

Dr O L RHYS

FIG 622



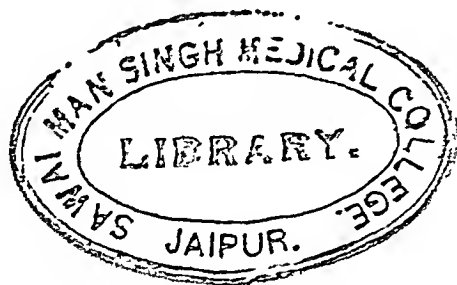
FIG 621



Fig. 623.—**BILIARY AND RENAL CALCULI** (showing different densities)

- i. Large gall-stone and three denser small ones.
- ii. Faeceted gall-stones, many showing “wedding-ring” appearance
- iii. Multiple gall-stones, showing development of “mosaie.”
- iv. Multiple gall-stones. showing development of “mosaie”; centres light.
- v. Faeceted gall-stones. whose centres are denser than their peripheries.
- vi. Large. light gall-stones formed by deposition around small dense ones.
- vii. Oxalate ealeulus of kidney—note far greater density than gall-stones.
- viii. Small gall-stones—observe eration.
- ix. Single cholesterin stone—note slight opacity.
- x. Calculus forming cast of renal pelvis, great density is apparent.
- xi. Renal calculi.
- xii. Renal calculi.

Dr L. A. ROWDEN.



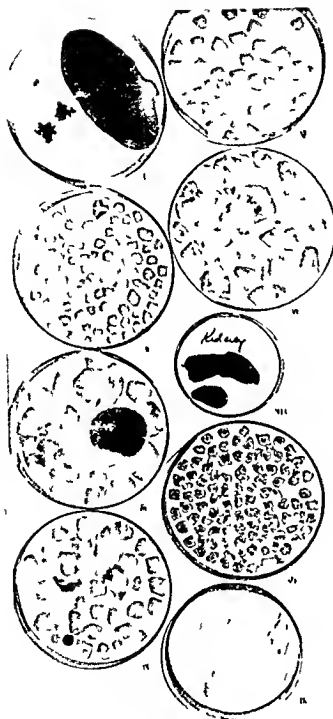


FIG 623



FIG. 624



FIG 625



FIG. 626



FIG. 627

GRAHAME-COLE METHOD

Fig 624 —GALL-BLADDER NORMAL

Cholecystograph —The gall bladder is well seen lying in front of and below the end of the twelfth rib

Dr L. A. ROWDEN

Fig 625 —GALL-BLADDER NORMAL

Cholecystograph —The organ is lying somewhat lower than usual, but is normal. Note the irregular calcification of the costal cartilages, which has, at times, led to a mistaken diagnosis

Dr L. A. ROWDEN

Fig 626 —LARGE GALL BLADDER

Cholecystograph —The organ appears almost spherical and is very opaque, showing that there is excellent concentration

Dr L. A. ROWDEN

Fig 627 —HIGH GALL BLADDER

Cholecystograph —The organ is lying higher than usual, being related to the eleventh rib, its concentration is good. Irregular costal calcification is manifest

Dr L. A. ROWDEN

N B —This method of examination has revolutionised our knowledge of the gall bladder mechanisms and liver functions. Sodium tetraiodo-phenolphthalein is given by mouth. It is excreted into the gall bladder, where it should be concentrated. Its appearance in the gall bladder, its concentration and rate of emptying are all of the utmost importance. moreover stones less dense than the medium cause filling defects

Figs. 628-631.—GALL-BLADDER. (See Fig 628)

Clinical History—A man, aged 36, had enteric thirteen years before, since when he has suffered from neuritic pains. Advanced spondylitis deformans was then present.

Screen—A dense gall-bladder shadow was seen.

Radiographs (P. A.).—After sodium tetrabromidophenolphthalein injection into the vein.

Fig. 628—4 hours. The gall-bladder is visible below the last rib; it has just begun to fill. (Gas is present in the hepatic flexure.)

Fig. 629.—8 hours. The organ is abnormally distended.

Fig. 630.—10½ hours. The viscus has discharged a considerable amount of its contents.

Fig. 631—24 hours. The gall-bladder is almost empty.

Note.—Oral administration of sodium tetraiodophenolphthalein is preferable to intravenous.—E.I.S.

Mr O. A. MARXER

Sir EDMUND SPRIGGS



FIG 628

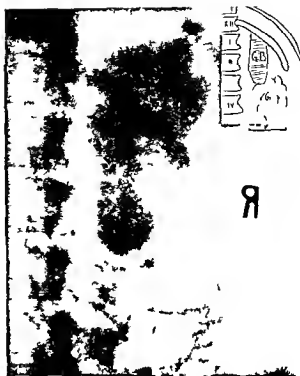


FIG 629

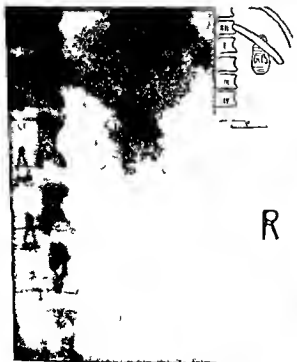


FIG 630

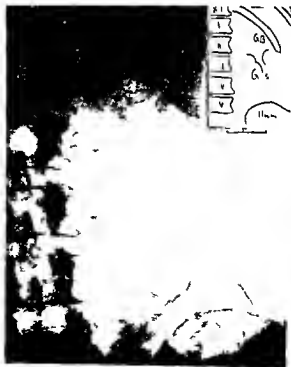


FIG 631

Fig. 632.—SMALL GALL-BLADDER. (See Fig. 625)

Cholecystograph.—The gall-bladder is small, ptosed and deformed, having a narrow waist; its concentration is good.

Dr L. A. ROWDEN.

Fig. 633.—PTOSED GALL-BLADDER. (See Fig. 625)

Cholecystograph.—The gall-bladder lies in front of the sacro-iliac joint: its density is normal.

Dr L. A. ROWDEN.

Fig. 634.—ADHESION OF GALL-BLADDER. (See Fig. 625)

Cholecystograph.—The fundus of the organ is almost completely separated from the body by a sharp indentation.

Dr L. A. ROWDEN.

Fig. 635.—GALL-STONES. (See Fig. 625)

Cholecystograph.—Numerous negative shadows were visible in the film: unfortunately they become less distinct on reproduction.

Dr L. A. ROWDEN.



FIG 632



FIG 633



FIG 634



FIG 635

Fig. 636.—GALL-STONES. (See Fig 625)

Clinical History.—A woman, 52 years old, had experienced repeated attacks of pain in the right subcostal region, associated with flatulent dyspepsia.

Cholecystograph.—The gall-bladder shows good concentration, its tip lies below the calcified costal cartilage. In the tip is a filling defect almost certainly due to a pure cholesterol stone

F TOLLEY

Mr J O HARRISON

Fig. 637.—GALL-STONES. (See Fig. 625)

Cholecystograph. — Two large stones, presenting the well-known “wedding-ring” appearance, are seen in a gall-bladder showing fair concentration. Their centres are less opaque than the medium, whilst their peripheries are more so.

Dr L. A. ROWDEN

Fig. 638.—GALL-STONES. (See Fig 625)

Cholecystograph.—A single small stone is seen in the fundus of the gall-bladder. Without a cholecystograph or pyelograph it would undoubtedly have been diagnosed from its density as a urinary calculus.

Dr L. A. ROWDEN

Fig. 639.—GALL-STONES. (See Fig 625)

Cholecystograph.—Multiple stones are seen in the gall-bladder, which shows poor concentration. One stone would have been diagnosed as renal but for this method of examination.

Dr L. A. ROWDEN.



FIG 636



FIG 637



FIG 638



FIG 639

Figs. 646 and 647.—CHRONIC APPENDICITIS

Clinical History —A man, aged 29, experienced fullness, discomfort and nausea after food for five years, and had hyperchlorhydria

Screen —The appendix was fixed by an adhesion of such strength as to be capable of suspending the cæcum in the erect position

Radiograph.—Fig 646 —The appendix is somewhat distended proximal to its kink Its outline throughout is irregular, the tip contains a concretion

Operation —The middle third of the appendix was looped up by old and recent adhesions It was removed (Fig 647)

Result —Complete relief

Mr O A MARXER

SIR EDMUND SPRIGGS.

Figs. 648-650.—CHRONIC APPENDICITIS

Clinical History —A male of 23 suffered from attacks of diarrhoea since childhood and frequently had mucus in the fæces He was subject to pain, nausea, heartburn, irritability and depression Charcoal, sour milk and ionisation had been tried without success

Screen —An obstruction was present in the appendix

Radiographs —Fig. 648 (10 hours after meal).—The appendix is distended and shows the characteristic appearance of barium spreading round a terminal concretion.

Fig 649 (2 days after meal) —Appendix still contains barium, spasm is present at one point

Operation —The appendix was thick and œdematous and contained several concretions (Fig 650)

Result —Digestion improved greatly and the colitis now yielded to treatment

Mr O A MARXER

SIR EDMUND SPRIGGS

Figs. 651-654.—CHRONIC APPENDICITIS

Clinical History —A youth, aged 16, gave a long history of abdominal discomfort and indigestion Six weeks before operation he had an attack of pain in the right iliac fossa and a temperature of 100° F

Screen —The appendix filled unevenly, spasm being present It was fixed and kinked

Radiographs —Fig 651 —The appendix is mottled, at one point spasm is present, evidenced by an abrupt gap in the opaque material

Fig 652 —Twenty days after Fig 651 the organ had failed to empty

Operation.—The appendix was bulbous, inflamed, and anchored to the blind of the pelvis Its distal part was fixed and near the tip were three concretions The mucous lining was seen to be ulcerated (Figs 653 and 654)

Mr O A MARXER.

SIR EDMUND SPRIGGS



FIG 646



FIG 647



FIG 648



FIG 649



FIG 650



FIG 651



FIG 652



FIG 653



FIG 654

Fig. 655.—**ULCERATIVE COLITIS: DYSENTERY.** (See Fig. 520)

Clinical History.—A man, aged 56, was admitted as an emergency, passing blood and mucus per rectum for the past six weeks, which was accompanied by cachexia and loss of weight. He had contracted dysentery when in India, where he had resided for fifteen years, but since leaving that country twenty-five years ago he had been free from gastro-intestinal trouble. Three years previously he had some chest trouble, in which he coughed up a considerable amount of purulent sputum.

Radiograph (after evacuation).—This shows generalised ulceration of the colon from the splenic flexure distally; little of the enema is present in this section. Along the margins of the colon are seen minute projections due to ulcers, hardly any trace of haustration is visible.

The presence of meal in the cæcum, ileum and proximal part of the ascending colon whilst the rest of the ascending colon is devoid of enema but full of gas, together with the presence of the normal haustration of the cæcum, are pathognomonic of dysentery.

Subsequent History.—No amœbæ were found in the stools. Ten days after admission he died, and a post-mortem showed ulceration of the whole colon.

Private Clinic.

Late Sir DAVID WILKIE.

Fig. 660.—CARCINOMA SIGMOID. (See Fig. 520)

Clinical History.—A man of 77 had increasing constipation for six months, much flatus was voided. Frequent desire for stool was followed by the passage of hard, small, broken fæces. He had lost weight.

Radiograph —Enema. The whole of the colon, from cæcum to rectum, is displayed. Some 14 cm. from the recto-sigmoid junction is a marked narrowing of the colon due to cancer, which is responsible for a small filling defect on the right side.

Operation.—Sigmoidoscopy—a buttonhole lumen was seen 17 cm from the anus. At operation a ring carcinoma, with secondaries in the omentum, was found, so a palliative colostomy was done.

Mr O A MARXER

SH EDMUND SPRIGGS



FIG 600

Fig. 677.—DIVERTICULOSIS. (See Fig 520)

Clinical History.—A male, aged 69, complained of intermittent pain in the lower abdomen. It was known that he had harboured a kidney stone for ten years. There had been diarrhoea until recently.

Screen.—Multiple diverticula seen

Radiograph (96 hours).—Diverticula are present throughout the colon and caecum. (Five weeks later some diverticula still contained barium.) A small renal calculus is seen on the left side.

Result—Treatment with paraffin, a bland diet and intestinal douches at low pressure greatly relieved the abdominal discomfort.

MR O A MARXER.

SIR EDMUND SPRIGGS

Figs 678–680.—DIVERTICULOSIS (See Fig 520)

Clinical History.—A woman, aged 38, had a child when 26; hysterectomy was performed two years later for hæmorrhage. She suffered from attacks of pain in the left abdomen which were thought to be renal crises. Constipation was marked.

Radiographs —Fig. 678 (Barium meal 5 days previous).—Scattered throughout the lower descending colon are beads of opaque medium.

Fig. 679 (Barium enema) —Projecting from, and in some instances at a slight distance from, the colon are saecules containing emulsion

MR O A MARXER

SIR EDMUND SPRIGGS

Fig. 680 (P.M. specimen).—This man, aged 56, was operated upon for a strangulated left inguinal hernia; pea-like bodies were felt along the colon. Some days later he died from pneumonia. At autopsy this condition was found; fringing the gut away from the tænia are two rows of diverticula

MR A P BRETWISTLE



FIG 677



FIG 678



FIG 679



FIG 680

Fig. 681.—DIAPHRAGMATIC HERNIA (See Fig. 512)

Clinical History.—Five years' pain in the back and over the left lower ribs, flatulence and heartburn formed some of the symptoms of a woman of 58, following a heavy fall.

Screen.—In the posterior mediastinum was an air-space.

Radiograph.—The stomach is divided by the diaphragm into an upper part containing secretion, gas and streaks of barium, and a lower part containing the main meal. Above and behind the cardia is seen the œsophagus, which is dilated; a distorted lower part is also seen lying alongside the stomach in the thorax.

Remarks.—The condition readily explains the symptoms.

N.B.—Same case as Fig. 663.

Mr O A MARXER

Sir EDMUND SPRIGGS

C. 2. 11. 4 1867

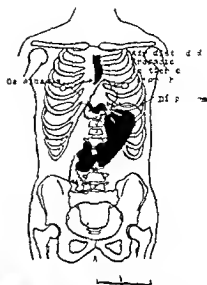


FIG 681

Fig. 682.—SUBPHRENIC ABSCESS. (See Fig 606)

Clinical History.—The patient, a farm-labourer, was operated upon for a gangrenous retrocaecal appendix. Anti-gas serum was injected twice. On the third day he developed acute dilatation of the stomach, which responded to alkaline lavage. His temperature remained between 98° and 100° for twenty-five days, when it gradually returned to normal, and he was sent away convalescent. He remained well for two months, then he began to run a temperature of 90° to 101° and was readmitted to hospital, where the question of tuberculosis was considered. He complained of pain in the lower part of the right chest, where there was a certain amount of dullness on percussion; exploratory needling failed to strike pus. Four months after operation he was readmitted running a temperature of 102° , and a diagnosis of subphrenic abscess was tentatively made. His temperature now reached 103° and successive attempts were made to locate pus. Each time the needle was inserted he had a hæmoptosis immediately afterwards, but no pus was obtained. Remembering the aphorism of Barnard. "Signs of pus somewhere, signs of pus nowhere else, pus there," needling was continued, until finally it was found by inserting the needle, directed upwards, just below the twelfth rib to avoid the costopleural angle; the pus was two inches deep.

Radiograph.—Fluoroscopy showed the right side of the diaphragm to be almost immobile. The radiograph shows elevation of the right side of the diaphragm; this elevation is not uniform, being greatest in the centre of the cupola. The heart shadow is not displaced. The characteristic gas bubble is not evident below the diaphragm as the patient was lying down.

Operation—A posterior incision was made along the costal margin and pus evacuated. Three weeks later a fresh incision was made above the first, when it was found that there was a deeper cavity communicating with the superficial one. A blood transfusion was given two weeks after the second operation, and a radiograph taken a week later showed no evidence of subphrenic abscess, only a small amount of fluid in the costophrenic angle. Two days after this examination the patient had a rigor, and died an hour later. No post-mortem was permitted.

Mr E. A. BULLMORE.

Fig 682

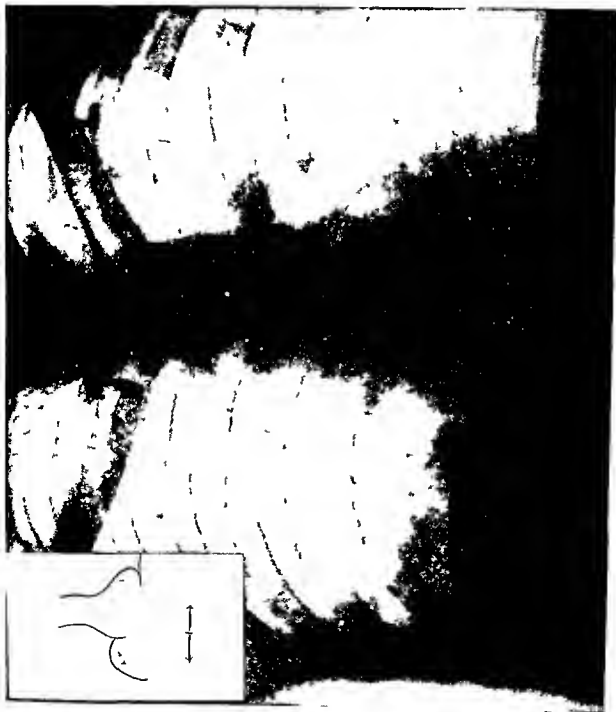


Fig. 683.—MESENTERIC CYST (See Fig. 504)

Clinical History.—A woman, aged 56, complained of abdominal pain and occasional vomiting. A palpable epigastric tumour was present

Screen.—Revealed a tumour invaginating the stomach.

Radiograph.—The lower part of the stomach is crescent-shaped, the hollow being occupied by a cyst.

Dr RHYS

Mr GEARY GRANT

Fig. 684.—INTESTINAL OBSTRUCTION

The intestinal coils are enormously distended with flatus and fluid. In the case of the colon much information regarding the position of the obstruction can be obtained by plain radiographs in cases of ileus. Strangulated hernia and volvulus are often strikingly demonstrated.

Dr L A ROWDEN

Fig. 685.—HIRSCHSPRUNG'S DISEASE. (See Fig 520)

Clinical History.—Girl, 13 years of age. The condition was unsuspected

Radiograph —Dilatation of the ascending colon is slight, but that of the transverse, descending and pelvic parts is enormous, haustration has almost disappeared. There are two fluid levels near the splenic flexure.

Dr L A ROWDEN

Fig. 686.—“ CUP AND SPILL ” STOMACH (See Fig 504)

Radiograph.—The fundus of the organ is occupied by a large quantity of gas, below which is part of the barium meal. Below and to the outer side of this is the body of the stomach, above which is a collection of gas. When the contents of the first part of the stomach reach a certain height they spill over into the body of the organ. Little is known of this curious state.

Dr W H ROWDEN

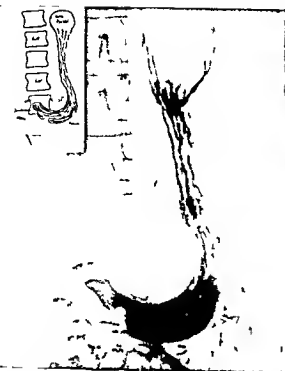


FIG 683



FIG 684



FIG 685



FIG 686

Figs. 687-690.—PANCREATIC CALCULI. (See Figs. 504-514)

Clinical History.—An Indian, aged 37, had pain in the epigastrium, radiating outwards; it was especially severe five to ten minutes after food. Six weeks before admission the pain had become much worse: he lost all desire for food. There was no jaundice or fatty stools, but marked tenderness above the umbilicus.

Radiographs.—Fig. 687.—Pancreatic calculi are seen in the duodenal loop and to the right of the first lumbar vertebra.

Fig. 688 (6½ hours after opaque meal).—Stones are visible along the whole course of the pancreatic duct.

Fig. 689 (24 hours after meal).—Shadows are seen above the colon

Fig. 690 (4 days after meal).—The calculi are very well seen

[*B M.J.*, vol. II, 1929 p 1054]

Dr SENNET



FIG 687



FIG 689



FIG 688



FIG 690

FOREIGN BODIES

Fig. 691.—IN DUODENUM

Radiograph.—An open safety-pin is seen lying in the duodenum. It was removed by open operation, owing to its arrest in a dangerous position.

Dr L. A. ROWDEN.

Fig. 692.—IN ILEUM

Radiograph.—A tooth-plate is seen in the lower ileum, the teeth are radiolucent. It was passed naturally two days later. Many of the modern plastic dentures are radiolucent.

Dr L. A. ROWDEN.

Fig. 693.—IN COLON

Radiograph.—A brooch (closed) is seen in the splenic flexure. It was voided naturally.

Dr L. A. ROWDEN.

Fig. 694.—COIN IN COLON. (See Fig. 512)

Radiograph.—An opaque meal has been given to determine whether this coin, a halfpenny, was in the stomach, in which event it would have been blotted out, neither is it in the duodenum, which contains much gas, it must therefore be in the ascending colon. The coin was passed per vias naturales.

Dr L. A. ROWDEN.

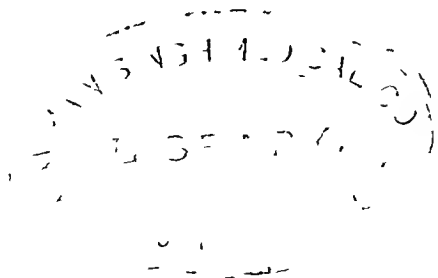




FIG 691



FIG 692



FIG 693



FIG 694



FIG. 695

Fig 695—NORMAL EXCRETION UROGRAPH

Pyelograph (10 minutes after injection)—The two major calyces are well defined and the minor calyces with their crescent shaped terminations are beautifully distinct. The position of the pelvis is normal on the left side, somewhat low on the right.

Late Mr JOCELYN SWAN





FIG 696

**Fig 696 —NORMAL EXCRETION PYELOGRAPH GALL-STONES AND
CALCIFIED GLANDS**

Abdominal symptoms

Radiograph —Gall stones and two shadows seen near iliac crest

Pyelograph —Descending This is not so sharply cut as ascending
To compensate for the loss of definition is the painlessness, the ease of
preparation and the fact that certain conditions counter-indicate the use
of instrumentation

Kinks are admirably revealed Two shadows near crest of ileum are
extraureteral they are calcified mesenteric glands

Dr J B HUGGINS



FIG. 697



FIG. 698



FIG. 699



FIG. 700

PITFALLS IN URINARY DIAGNOSIS

Fig 697—PHLEBOLITHS

Radiograph—A ureteric catheter has been passed via a cystoscope. Two shadows are seen, one on the left just above the pubis, the other, near the iliac spine, both well outside the line of the catheter.

Dr L. A. ROWDEN

Fig 698—NORMAL PYELOGRAPH

Pyelograph—One form of normal but low renal pelvis, in which the infundibula appear to come off a continuation of the ureter upwards.

Dr J. C. RANKIN

Late Prof. A. FULLERTON

Dr R. M. BLATH

Mr R. M. LEMAN

Figs 699 and 700—CALCIFIED GLANDS (A P and P A)

Radiographs—Note that the shadows are denser and smaller when viewed in the A P position, showing that, unlike urinary calculi, they are nearer the anterior than the posterior abdominal wall.

Dr L. A. ROWDEN

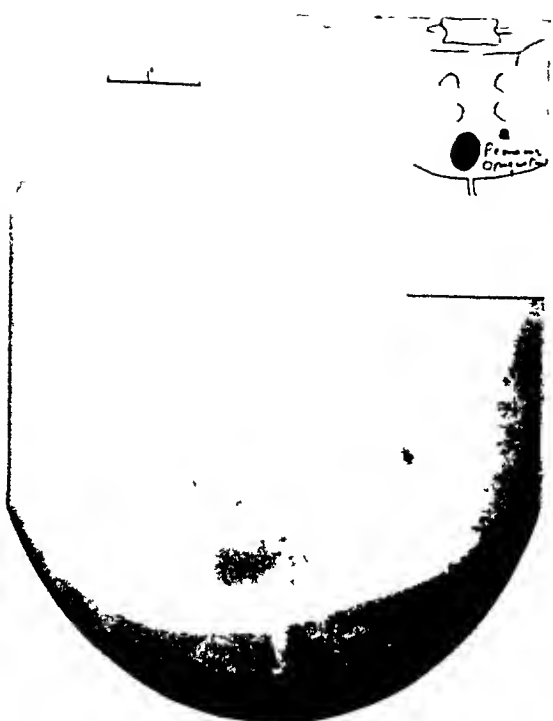


FIG. 701

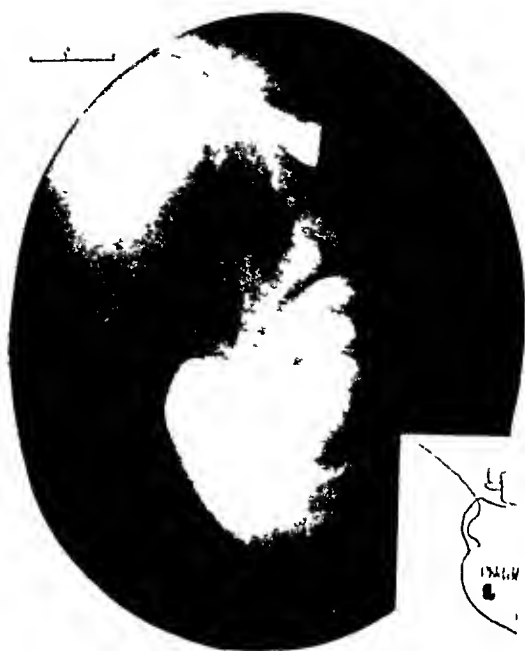


FIG. 702



FIG. 703



FIG. 704

PITFALLS IN URINARY DIAGNOSIS

Fig 701 —REMAINS OF OPAQUE MEAL

Radiograph —These could readily be mistaken for two calculi, the larger in the bladder, the other in the ureter

Dr L A ROWDEN

Fig 702 —PHLEBOLITH

Clinical History —A man of 43 suffered abdominal pain for some time, haematuria had occurred twice recently, followed by severe pain

Screen —A calculus was visible in the left kidney, right urinary tract was normal

Radiograph —A phlebolith is seen some distance from the right side of the sacrum

Operation —Calculus removed from left kidney

Remarks —The danger of ascribing the symptoms to calculus of the right ureter is very obvious, emphasising the need for complete examination of the urinary tract in all doubtful cases

Dr L A ROWDEN

Fig 703 —PHLEBOLITHS

Radiograph —Four concretions formed by the calcification of blood clot are seen in the pelvis and three larger and more irregular ones are visible at the iliac crest

Dr L A ROWDEN

Fig 704 —NORMAL CYSTOGRAPH

The bladder has been filled with 12½ per cent sodium iodide in 1 in 3000 mercury perchloride. Note the smooth, even contour, the shadow is close to the pubis. — — —

Dr J C RANKIN

Dr R M BENTH

Mr R M IEMAN

Late Prof A FULLERTON

Figs. 705-707.—RENAL AND URETERAL CALCULI. (See Fig 695)

Clinical History.—The woman, aged 41, had experienced intermittent attacks of pain in the right side for a period of fourteen years. During the last two years recurring attacks of a less severe nature were felt on the left side. No obvious hæmaturia.

Radiograph.—Fig. 705.—A large branched calculus occupies the left renal pelvis and calyces. On the right side several small calculi in a ptosed organ and two calculi in the pelvic ureter, are seen, one shadow being superimposed on that of the ilium.

Opaque Catheter—Fig. 706.—The catheter on the left side has passed upwards to the kidney, that on the right has been arrested at the calculi.

Pyelograph (Ascending).—Fig. 707.—Marked dilatation of the pelvis and calyces is apparent on the left.

Treatment.—In view of further tests of renal efficiency it was decided only to remove the calculi in the right ureter by uretero-lithotomy.

Late Mr JOCELYN SWAN



FIG 705



FIG 706



FIG 707

Fig. 708.—RENAL CALCULUS

A man of 30.

Radiograph.—Below the last rib is seen a calculus forming a cast of the pelvis, infundibula and calyces of the left kidney.

Operation.—A large branching calculus occupied the pelvis and calyces: it articulated with others. Nephrectomy was performed; stones the size of a pin's head were found in the lowest calyx.

Dr J. C. RANKIN.
Dr R. M. BEATH.
Mr R. M. LEMAN.

Late Prof A. FULLERTON

Fig. 709.—RENAL CALCULUS AND SAND

Radiograph.—The kidney outline is seen near the iliac crest and above the last rib, indicating enlargement and not ptosis. In the upper pole of the pelvis is an oxalate calculus, whilst in the lower part of the kidney is "sand."

Remarks.—The cause of the enlargement is not obvious, the calculus not being in a position to cause hydronephrosis.

Dr L. A. ROWDEN

Figs. 710 and 711.—RENAL CALCULI

Clinical History.—A woman, aged 45, had suffered from renal colic and pyuria for some years.

Radiographs (P.A.).—Fig. 710.—Three large and one small faceted calculi are seen just below the last rib.

(Lateral).—Fig. 711.—The calculi are seen superimposed on the intervertebral disc.

Treatment.—The calculi were removed by pyelolithotomy.

Inset on Fig. 711 is seen a direct radiograph of the stones removed.

Late Mr JOCELYN SWAN.



FIG 708

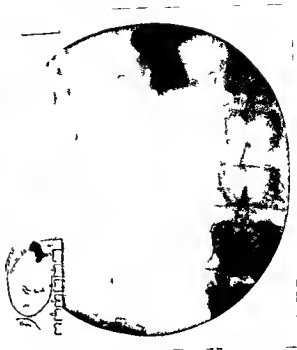


FIG 709



FIG 710



FIG 711

Figs. 712-715.—RENAL CALCULUS. (See Fig. 695)

Clinical History.—For nine months a man, aged 46, had suffered renal colic and hæmaturia.

Radiograph.—Fig. 712.—A calculus is seen on the left of the second lumbar vertebra

Opaque Catheter.—Fig. 713.—The calculus touches the catheter, proving that the stone is in the renal pelvis.

Pyelograph (Ascending).—Fig. 714.—The calculus is largely obscured by the medium but can be seen to be in the upper dilated major calyx

Radiograph — Fig. 715.—Direct X-ray picture of calculus when removed.

Late Mr JOCELYN SWAN



FIG 712



FIG 713



FIG 714



FIG 715

Fig. 716.—RENAL CALCULUS

Clinical History.—A male, aged 23, had attacks of pain associated with constipation once a month. There had been some hæmaturia

Radiograph—A cup-shaped stone lies in the kidney just below the last rib, probably consisting largely of calcium oxalate.

Dr L A ROWDEN

Fig. 717.—RENAL CALCULUS

Clinical History.—A multipara, aged 66, experienced pain in the right loin, groin and leg for eight days. There was a palpable kidney swelling.

Radiograph—An irregularly rectangular stone bearing two projections is present; the low position implies some ptosis of the organ.

Dr L A ROWDEN

Fig. 718 —RENAL CALCULI

Radiograph—Three calculi are seen. One less dense than the others forms a cast of the renal pelvis, whilst the lowest one shows a characteristic laminated appearance. Hydronephrosis is apparent, judging by the distance between the shadows

Dr L A ROWDEN

Fig 719 —RENAL CALCULUS

Clinical History—A man, aged 33, had a large calculus removed previously.

Radiograph—A dense shadow is seen just beneath the last rib; several minute calculi and sand are seen

Remarks.—The density suggests a calcium oxalate basis.

Dr L A ROWDEN

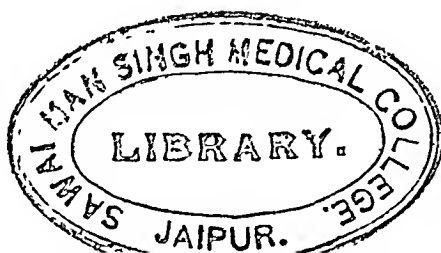




FIG 716

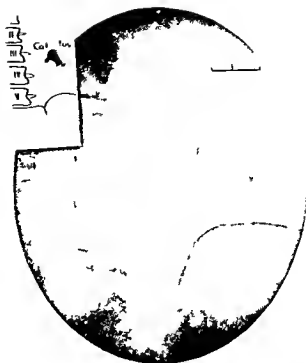


FIG 717



FIG 718

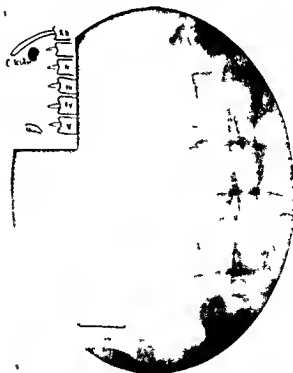


FIG 719

Fig 720 —HYDRONEPHROSIS AND HYDROURETER. (See Fig 695)

Clinical History —A female of 19 suffered from an aching pain in the left loin

Pyelograph (Ascending) —On the left side the ureter and renal pelvis are grossly dilated, but about one inch of the ureter near the renal pelvis is of normal calibre, as is the termination

The right kidney pelvis appears normal, some extra-ureteric shadows are visible, probably calcified mesenteric glands

Treatment —Operation refused.

Late Mr JOCELYN SWAN

Fig. 721.—DILATATION OF URETER (See Fig 695)

Clinical History —The woman, aged 29. complained of nagging pains in the left lumbar region

Radiograph —An ascending pyelograph revealed dilatation of the left ureter, starting at its vesical origin.

Treatment.—The condition was cured by endothermic splitting of the ureteric orifice in the bladder.

Late Mr JOCELYN SWAN

Fig. 722.—ACCESSORY RENAL ARTERY. (See Fig 695)

A woman, aged 56

Pyelograph (Ascending).—Typical left hydronephrosis due to an aberrant artery to the lower pole of the kidney; constriction and dilatation of the ureter is manifest The case has features like those of Fig 720

Treatment —Nephrectomy

Late Mr JOCELYN SWAN

Fig 723.—TUBERCULOUS KIDNEY

Radiograph.—The kidney has been replaced by a mottled mass of caseous material, impregnated with calcium.



FIG 720

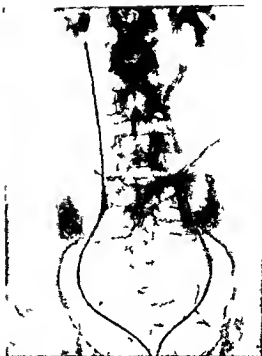


FIG 721



FIG 722



FIG 723

Figs 724 and 725.—HYDRONEPHROSIS. (See Fig. 695)

Radiograph (P A) —On the left side are seen two irregular calculi obviously, by their shape, in the renal pelvis, whilst on the right are three calculi in the position of the ureter, one being at the sacro-iliac synchondrosis, the others opposite the ischial spine

Pyelograph —A large hydronephrosis is apparent on the right side, caused by stones in the ureter. Two small calculi occupy the dilated left pelvis.

Result —The patient was suffering from renal insufficiency and was unsuitable for operation, death took place from uræmia

Dr J C RANKIN
Dr R M BEATH
Mr R M LEMAN

Late Prof A FULLERTON

Fig. 726.—ACCESSORY RENAL ARTERY (See Fig 695)

Clinical History —For six years a boy of 12 had complained of left lumbar pain

Pyelograph (P.A) —The pelvis of the kidney is large and shows no calyces, implying expansion of the pelvis rather than destruction of the renal tissue

Operation —On exploration the pelvis was found to be the size of a hen's egg. An accessory renal artery was found passing from the aorta to the lower pole of the kidney in front of the upper end of the ureter. The artery was divided between ligatures, with complete relief of pain

Dr J C RANKIN
Dr R M BEATH
Mr R M LEMAN

Late Prof A FULLERTON

Fig. 727.—HYDRONEPHROSIS. (See Fig 695)

Clinical History —A woman of 50 had complained of pain in the loin for several years; it radiated from there to the groin. Hæmaturia occurred two years before

Radiograph —The outline of the kidney is visible. A triangular dense stone occupies the renal pelvis, forming a rough cast of it, and a small round one is seen at the origin of the ureter. Two groups of stones occupy other parts of the kidney.

Remarks —The normal position of the pelvis and the low position of one group of stones imply hydronephrosis caused by the ureteric stone

Dr L A ROWDEN



FIG 724



FIG 725



FIG 726



FIG 727

Fig. 728.—BILATERAL HYDRONEPHROSES AND HYDROURETERS.

(See Fig 695)

Clinical History.—The man, aged 52, was operated on for calculi in the pelvic portion of each ureter, twenty years previously. At that time he had suffered from complete suppression of urine for forty-eight hours and had pain in the right side. Ureterolithotomy was performed and the patient did well. He now complained of indefinite backache.

Pyelograph (Ascending).—The pelvis of each kidney is grossly dilated, as is each ureter, the left minor calyces ending bluntly

Late Mr JOCELYN SWAN.

Fig 729.—DOUBLE URETER AND KIDNEY. (See Fig 695)

Clinical History —The woman, aged 35, suffered from an aching pain in the right loin

Pyelograph (Ascending) —The tip of the catheter has lodged at the point of union of the two ureters. Only two minor calyces present the crescent termination, the others being grossly deformed. The left kidney was normal.

Treatment.—Nephrectomy.

Late Mr JOCELYN SWAN

Figs. 730 and 731.—EXTRA-RENAL TUMOUR. (See Fig. 695)

Clinical History —The man, aged 41, had his left testis removed for sarcoma. There was now a palpable tumour in the left loin.

Pyelograph (Ascending) —Fig. 730.—The lower part of the renal pelvis and ureter above the ilium are displaced outwards by the tumour.

Treatment —Fig 731.—After insertion of Radon seeds some decrease in the size of the tumour is apparent.

Late Mr JOCELYN SWAN



FIG 728



FIG 729



FIG 730



FIG 731

Fig. 732.—FLOATING KIDNEY. (See Fig. 695)

Clinical History.—A woman had, for several years, experienced Dietl's crises, with pain in the right lumbar region.

Pyelograph —The pelvis is very low and the ureter "corkscrewed."

Operation.—The organ was anchored in position, with the result that she has experienced no attacks during the last three years

Late Mr F. KIDD.

Fig. 733.—HORSESHOE KIDNEY. (See Fig. 695)

Clinical History —A man, aged 41.

Pyelograph (Ascending).—Note the presence of calyces on the inner side of the pelvis, showing that it is of the horseshoe form. The pelvis and calyces are grossly dilated.

Late Mr JOCELYN SWAN.

Fig. 734.—CONGENITAL CYSTIC KIDNEY. (See Fig. 695)

Pyelograph.—The pelvis occupies a low position and is greatly distorted.

Dr J. C. RANKIN.

Dr R. M. BEATH

Mr R. M. LEMAN.

Late Prof A. FULLERTON.

Fig. 735.—EXTRA-RENAL TUMOUR. (See Fig. 695)

Clinical History —The man, aged 32, had his left testis removed four months previously for adenocarcinoma, which was followed by palpable glands about the renal vessels.

Pyelograph (Ascending).—This shows the ureter and pelvis displaced outwards by the tumour. The pelvis is not grossly deformed.

Late Mr JOCELYN SWAN.

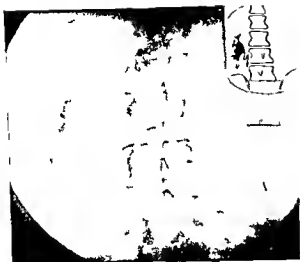


FIG 732



FIG 733



FIG 734



FIG 735

Figs 736 and 737.—**FLOATING KIDNEY.** (See Fig 695)

Clinical History.—A patient had severe attacks of renal colic, radiating to the inguinal region and urethra.

Pyelograph (On admission).—Fig. 736 —The kidney has dropped, the ureteric origin being opposite L 3. The commencement of the ureter shows a well-marked double twist.

Operation —The kidney was fixed to the external arcuate ligament.

Pyelograph (After operation) —Fig. 737.—Note the high position of the renal pelvis and the undoing of the kinks of the ureter; it is still dilated

Result —Complete relief of symptoms

Dr J RANKIN
Dr R M BEATH
Mr R M LEMAN

Late Prof A FULLERTON

Fig. 738.—**HYDRONEPHROSIS**

Clinical History —A woman, a nullipara, suffered pain in the left loin and frequency, for a year.

Radiograph (P.A.).—The renal shadow is clearly seen extending from within an inch of the ileum to the level of the first lumbar vertebra. The shadow above the kidney is probably the spleen

Dr L A. ROWDEN

Fig. 739.—**FLOATING KIDNEY.** (See Fig 695)

Clinical History.—A patient had suffered renal pain for some time.

Pyelograph.—The pelvis joins the ureter at right angles, the former occupies a low position.

Operation —The acute bend was found to be due to rotation of kidney. Fixation of the kidney in the normal position related to the last rib—*i.e.* with its upper pole directed upwards and inwards instead of directly upwards—gave complete relief

Dr J C RANKIN
Dr R M BEATH
Mr R. M LEMAN

Late Prof A FULLERTON



FIG 736



FIG 737



FIG 738

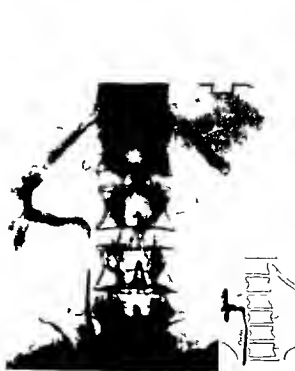


FIG 739

Fig. 740.—PYELONEPHRITIS: RIGHT. (See Fig. 695)

Excretion Pyelograph.—Compare the right and left sides, the latter being only slightly affected. The pelvis on the left is small, its calyces end in crescents, the ureter is small. On the right the pelvis is large, the major calyces end roundly: no trace of minor calyces is visible, the outlines are fuzzy. The ureter is dilated and its shadow is not uniform, being very light near the renal pelvis.

D. J. B. HUGGINS

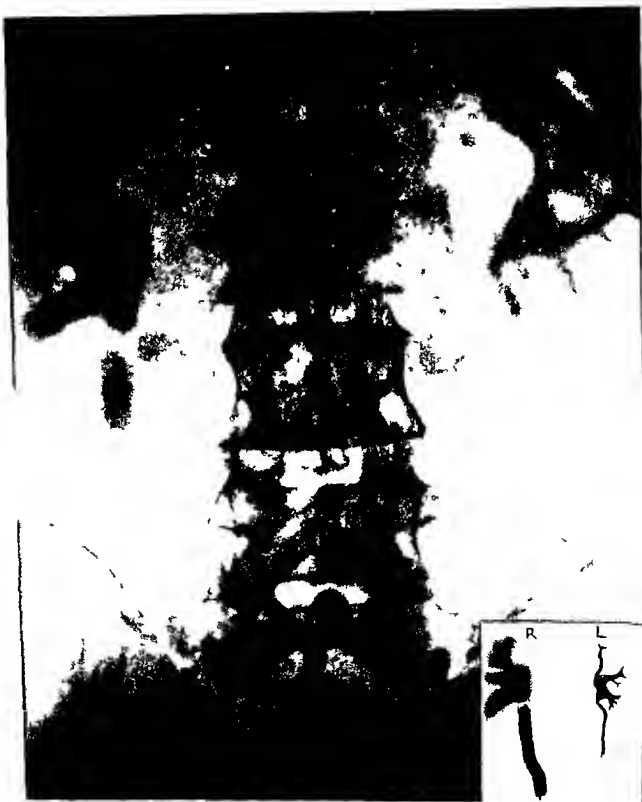


FIG 740

Fig. 741 —POLYCYSTIC DISEASE. (See Fig 695)

A female, aged 42

Pyelograph (Ascending) —Note the elongation of the minor calyces, aptly likened to a spider's legs.

Late Mr JOCELYN SWAN

Fig. 742 —HYPERNEPHROMA

Clinical History —A woman of 49 underwent a laparotomy when 31. For the last six years she had experienced epigastric distress and pains in the back, both of which had increased during the last three years; during this time she had vomited blood and lost weight; on admission she appeared wasted. A large tender tumour was palpable in the left hypochondrium which was thought to be the spleen. The blood picture showed hyaline cells 6 per cent., but was otherwise normal as regards leucocytes; the red cells were small, being 6.8μ . No occult blood was passed.

Radiograph.—A large spherical tumour, in which are scattered areas of calcification, is seen in the upper left quadrant. D. 12 shows rarefaction, probably due to secondary deposit.

Subsequent History.—Whilst in hospital the patient sweated profusely, and ran a temperature of 99° . A tumour appeared in the flank, which was found to be continuous with that in the abdomen. The original tumour increased rapidly in size downwards and inwards until finally it crossed the middle line. No albuminuria was present; the patient was too ill for a pyelogram to be taken.

Post-mortem —The mass was found to be a malignant kidney with secondary deposits in the liver. The spleen was normal.

N.B.—This long, vague history is characteristic of hypernephroma, the tumour behaving in a simple manner for years before taking on rapid malignant growth.

Miss M SCARR

Mr E A BULLMORE



Fig 742

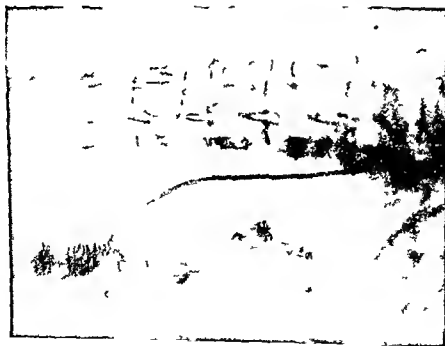


Fig 741

Fig. 743.—HYPERNEPHROMA. (See Fig. 695)

Clinical History.—The man, aged 54, had suffered recurrent attacks of hæmaturia and pain in the right loin during the past six months

Pyelograph (Ascending).—The lower part of the renal pelvis is obliterated by a filling defect due to tumour. The upper part of the pelvis is dilated as the result of obstruction at the ureteric opening.

Treatment—Nephrectomy.

Late Mr JOCELYN SWAN

Fig. 744.—HYPERNEPHROMA (See Fig 695)

Clinical History.—A woman, aged 56.

Pyelograph (Ascending) —Note the wide space between the kidney and the vertebral column, which is curved. All the minor calyces are grossly deformed.

Late Mr JOCELYN SWAN.

Fig. 745.—HYPERNEPHROMA. (See Fig. 695)

Clinical History —A man, aged 49, experienced pain in the left loin, where a tumour was palpable, provisionally diagnosed as a carcinoma of the colon until laparotomy was performed, which showed the tumour to be arising from the left kidney

Pyelograph (Ascending).—Very marked flattening and elongation of the renal pelvis is apparent; it has been displaced outward by the tumour.

Treatment—Nephrectomy.

Late Mr JOCELYN SWAN

Fig 746.—HYPERNEPHROMA. (See Fig 695)

Clinical History.—The man, aged 67, had experienced recurring attacks of painless hæmaturia. Intravenous pyelography revealed the absence of excretion on the right

Pyelograph (Ascending).—The calyces on the right side are markedly flattened, due to a growth in the upper pole of the kidney.

Treatment—Nephrectomy was done. Histological examination revealed the typical findings of hypernephroma.

Late Mr JOCELYN SWAN



FIG 743



FIG 744



FIG 745



FIG 746

Fig 747—TUBERCULOUS KIDNEY. (See Fig 695)

Pyelograph—The ballooning of the upper calyces is well seen; one or more pyramids being eroded.

Operation—A tuberculous abscess one inch in diameter, with thick walls, not communicating with the pelvis, was found in the cortex. The infundibula and calyces were dilated. Groups of tubercles were seen on the renal surface, the ureter was thickened.

Dr J C RANKIN
Dr R M BEATH
Mr R M LEMAN

Late Prof A FULLERTON

Fig. 748.—TUBERCULOUS KIDNEY. (See Fig 695)

Clinical History—A woman, aged 23.

Pyelograph (Intravenous).—The terminations of the minor calyces of the left kidney present the typical woolly appearance of tuberculosis, the size of the major calyces is greatly increased.

Late Mr JOCELYN SWAN.

Fig. 749.—CASEATION OF KIDNEY

Clinical History.—The man, aged 35, had experienced increasing frequency of micturition and pyuria for twelve years. Examination revealed bilateral renal tuberculosis.

Radiograph.—The renal pelvis, somewhat ptosed, is occupied by calcareous material, scattered areas in the pyramids are evident.

Late Mr JOCELYN SWAN

Fig 750 —CASEATION OF KIDNEY

Radiograph—The kidney has calcified *en bloc*, retaining the renal shape. The line of the ureter is marked out by calcified deposit and at some distance from it are calcified glands.

Late Mr JOCELYN SWAN.

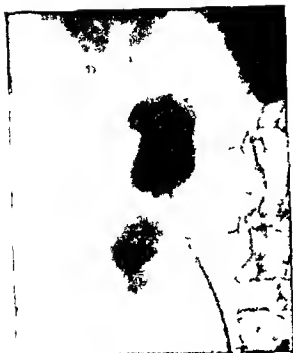


FIG 747

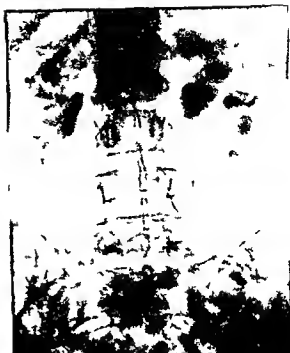


FIG 748



FIG 749



FIG 750

Fig. 751.—URETERAL CALCULI

Clinical History.—A woman of 62 had a vesical calculus removed three years previously. She had one attack of colic the next year and one two months later: otherwise she had been well.

Radiograph.—Two large oval calculi are seen in the lower end of the ureter, the larger below the sacro-iliac joint.

Dr L. A. ROWDEN.

Mr C. B. PAUL

Fig. 752 —URETERAL CALCULI (See Fig 695)

Radiograph.—The opaque catheter is seen to be arrested by two pea-like calculi lying near the sacro-iliac articulation.

Dr J. C. RANKIN

Late Prof. A. FULLERTON.

Dr R. M. BEATH

Mr R. M. LEMAN

Fig. 753.—URETERAL CALCULUS

Clinical History.—A man of 44 had been passing gravel for a year, but for two years he had been free. He had now been suffering from renal colic for four days.

Radiograph.—An irregular calculus is seen in the pelvic ureter. Its nucleus is denser than its periphery.

Operation —A calculus was removed an inch from the bladder.

Remarks.—The centre of the stone is probably Oxalate, the periphery Phosphate.

Dr L. A. ROWDEN.

Fig. 754 —URETERAL CALCULI

Radiograph.—Three shadows are seen. two on the right side opposite the tips of the transverse processes of the fourth and fifth lumbar vertebræ. one on the left opposite the fourth vertebra. The outline of the psoas is clearly seen, as should be.

Remarks.—Their date-stone shape and relation to the vertebræ indicate that they are in the ureter.

Dr L. A. ROWDEN

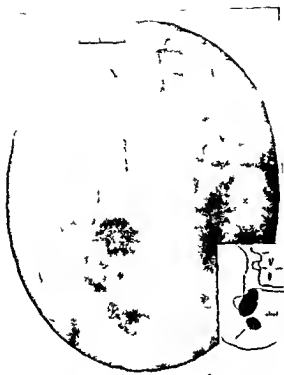


FIG 751



FIG 752



FIG 753

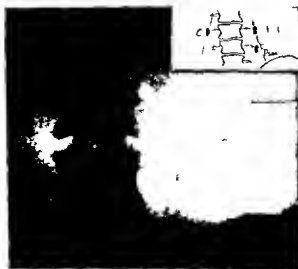


FIG 754

Fig. 755.—VESICAL CALCULI

Radiograph.—Two dense oval and two less dense spherical and oval calculi are visible above the pubic symphysis. Does the oval shape indicate a ureteric origin?

Dr W H ROWDEN.

Fig. 756.—VESICAL CALCULI

Clinical History—A male, aged 71, was operated on two and a half years before for vesical calculi; the prostate was removed. During the last twelve months he had experienced considerable difficulty in passing urine, which he did with great frequency.

Radiograph.—Multiple stones are apparent, in each stone is a ring of denser material.

Treatment.—The calculi were removed through the suprapubic route.

Late Mr JOCELYN SWAN.

Fig. 757.—VESICAL CALCULI

Radiograph.—Three well-marked oval calculi are seen above the symphysis pubis.

Dr L A ROWDEN

Fig. 758.—VESICAL CALCULUS

Clinical History—For a year a man, aged 48, had difficulty and pain in passing urine. The stream was slow, retention occurred periodically. No stricture, prostatic enlargement, or nervous disease was present.

Radiograph—A large oval calculus is seen well above the symphysis pubis. It contains a dense nucleus, encrusted by a layer of phosphates.

Operation.—Since lithotomy he has, for the last three years, been free from symptoms.

Late Mr F KIDD.



FIG 755



FIG 756

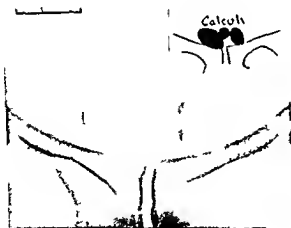


FIG 757



FIG 758

Fig. 759.—CARCINOMA BLADDER. (See Fig 704)

Cystograph.—The right side of the bladder is flattened, owing to what proved to be a carcinomatous ulcer. The ureteric sphincter has been destroyed, allowing the sodium bromide to pass up the ureter.

Operation.—A carcinomatous ulcer, 2 in. across, which just reached the opening of the ureter, was found. The right half of the bladder with the ureter was removed. the latter being implanted into the other half.

Dr J C RANKIN
Dr R M BEATH
Mr R M LEMAN

Late Prof A. FULLERTON.

Fig. 760.—VESICAL POUCHES. (See Fig. 704)

Clinical History.—A man of 61 had suffered pain for several years. He had hæmaturia and pyuria ; a stricture had been divided.

Cystograph (Silver Iodide Emulsion).—Three pouches are present, evidently due to back pressure. The prostate contains many calculi, whilst several phleboliths are present.

Late Mr F. KIDD.

Fig. 761.—PROSTATIC AND URETHRAL CALCULI

Clinical History.—A man, aged 43, had symptoms of vesical calculus. He had passed some gravel, but no blood.

Radiograph —Shows a number of small prostatic calculi around the upper part of the symphysis pubis. There is a large, irregular stone in the membranous portion of the urethra.

Operation.—The urethral calculus was removed.

Dr L A ROWDEN

Fig. 762 —CARCINOMA BLADDER. (See Fig 704)

Clinical History.—A man, aged 62.

Cystograph —On the left side of the bladder is a radiolucent patch due to the presence, there, of a fungating tumour. This has destroyed the sphincter of the ureter so that opaque material can enter it, the ureter on this side is dilated.

Late Mr JOCELYN SWAN



FIG 759



FIG 760

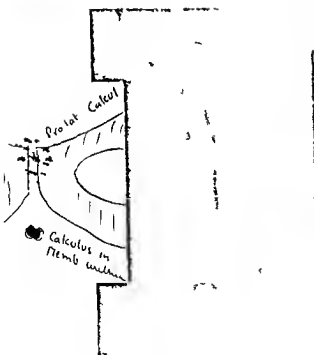


FIG 761



FIG 762

Fig. 763.—FOREIGN BODY IN BLADDER

A married woman of 23.

Radiograph.—Shows a hair-pin above the pubis: round the closed end a stone has formed.

Operation—The stone was crushed with a lithotrite, thus freeing the hair-pin, which was seized and removed by the forceps of an operating cystoscope.

Dr J C RANKIN

Late Prof A FULLERTON

Dr R M BEATH

Mr R M LEMAN

Fig. 764.—PIN IN PROSTATE

Clinical History.—A vesical stone containing four pins had been removed previously, they had been placed in the urethra by a prostitute

Radiograph—Shows a pin embedded vertically in the prostate.

Dr L A ROWDEN

Fig. 765.—URETHRAL CALCULUS

Radiograph.—A stone is seen below the symphysis pubis in a child about 10 years old.

Remarks—Calculus must always be considered in cases of retention and bed-wetting in boys.

Dr L A ROWDEN

Fig. 766.—PENILE CALCULUS

Radiograph.—A large, oval calculus is seen impacted in the fossa navicularis of the urethra—*i.e.* the narrowest part of the tube; it is fractured

Remarks.—Such are readily extracted with forceps, with or without a small dorsal incision into the meatus

Dr L A ROWDEN



FIG 763

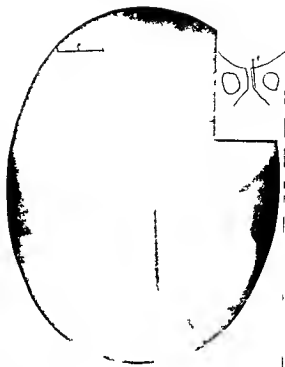


FIG 764

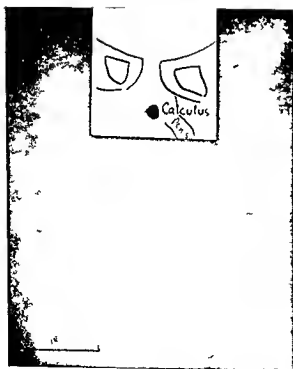


FIG 765



FIG 766

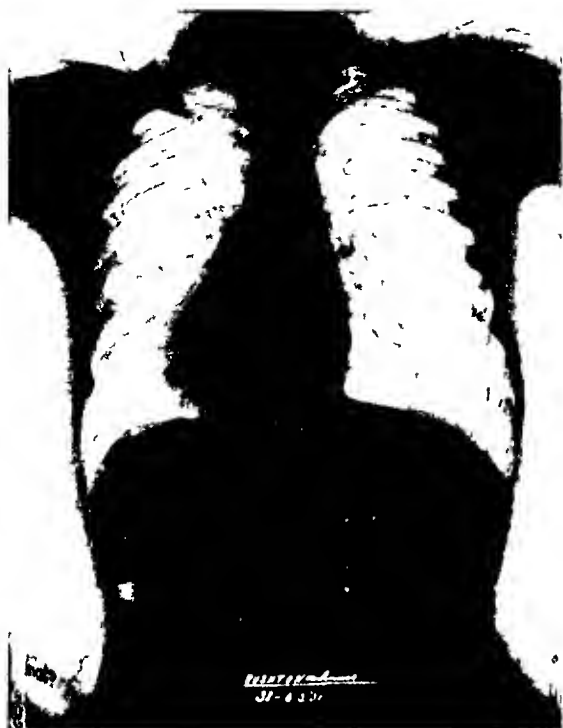


FIG 767

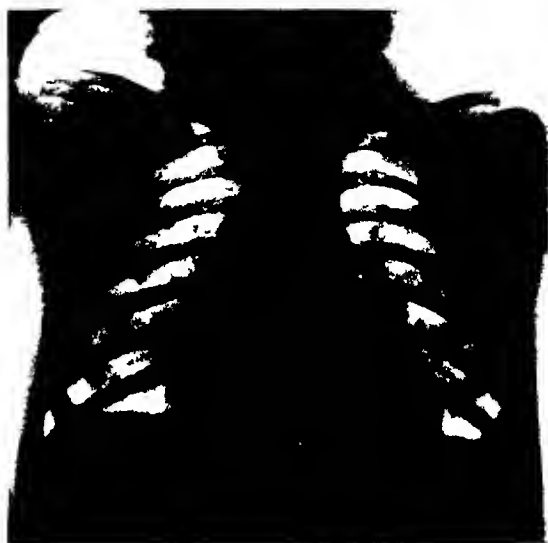


FIG 768



FIG. 769



FIG 770

Fig 767—NORMAL CHEST (Age 11)

Clinically—This girl had never had a day's illness of any kind, she was robust and full of energy

Screen—The movement of the diaphragm was good and the lung fields lit up well

Radiograph (P A)—The diaphragm is regular in outline, the right leaf is slightly above the left, the costo phrenic angles are open

Lung—The reticulum is definite and free from nodules, even at the periphery with the scapula withdrawn the marbled appearance is visible

Mediastinum—This is in the mid line The trachea is seen with the main right bronchus

Heart—On the left, from above downwards, are seen the aortic knuckle, the bulge of the pulmonary artery and the left ventricle On the right is the slight bulge of the right ventricle, normally about half an inch

Lilum—The right lulum appears larger than the left In shape they are somewhat crescentic, extending almost from the clavicle, above, to the diaphragm, below

Cheshire Joint Sanatorium

Dr PETER EDWARDS

Fig 768—NORMAL CHEST (Age 14)

Fig 769—NORMAL CHEST (Age 30)

Radiograph—Note the great increase in density of the bronchial tree and lung generally, compared with Fig 768 Some anthracosis is present

Dr T I CANN

Fig 770—NORMAL CHEST (Age 50)

A male

Radiograph—The lung fields show characteristically healthy markings of uniform opacity The hilar markings are more in evidence than in younger subjects The leaves of the diaphragm are sharply outlined The heart can be seen close to the right of the sternum the pulmonary bulge is just visible as is the aortic knuckle

F TOLIN

Dr HOLMES WATKIN

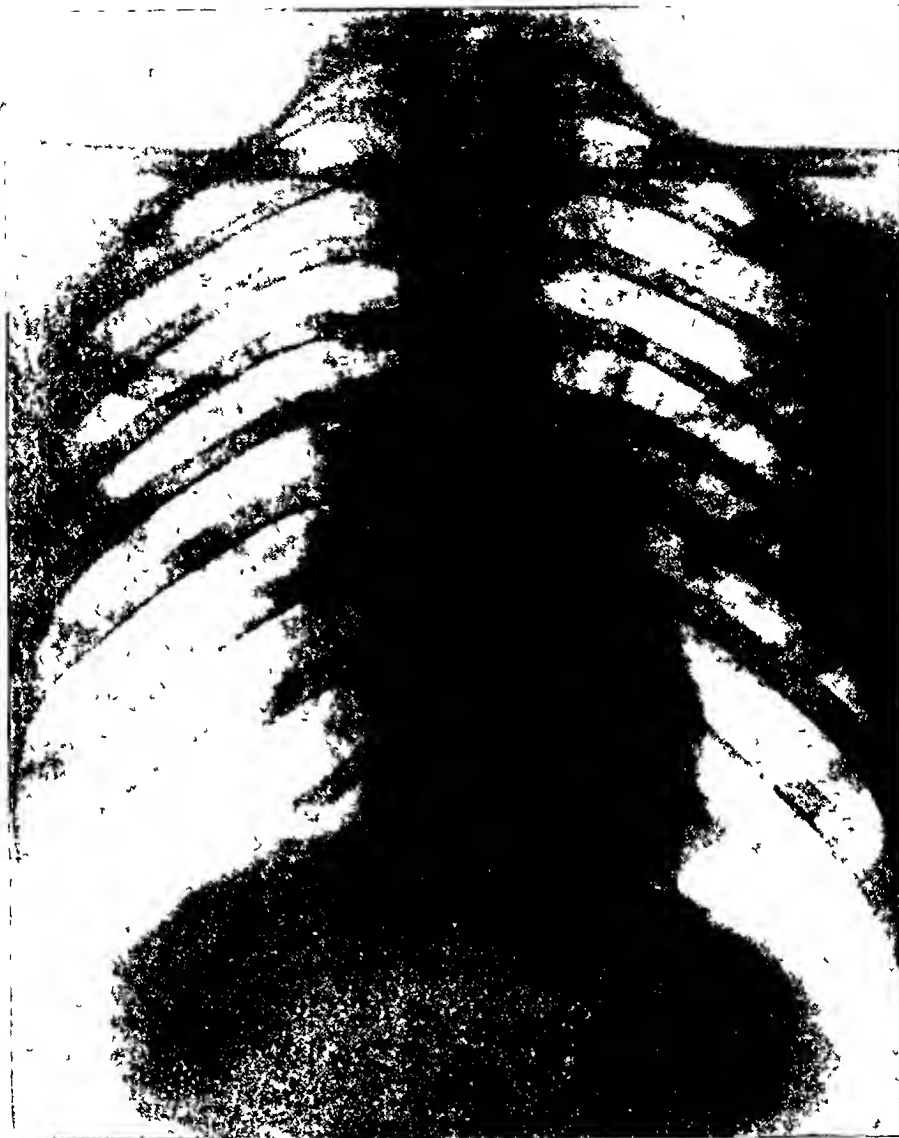


FIG 771

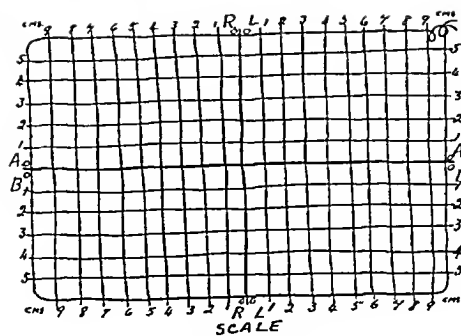


FIG. 772

Fig 771—NORMAL CHEST (Age 20)

A male who had always been healthy

The lung fields have a uniform reticular appearance

A heated controversy has raged round the nature of the radiating hilar shadows some contending that they were vascular others including the writer, that they were bronchial in origin. Evidence is accumulating that the former school of thought is correct. The fact that these shadows increase in density with age when calcification occurs in the bronchi and not in the arteries is not explained. Twining lists the following as proving that they are vascular in origin

- 1 In the left hilum the left branch of the pulmonary artery can be seen a considerable interval separating it from the bronchus
- 2 When the lung is collapsed in artificial pneumothorax the hilar arborisations tend to disappear due to absence of blood
- 3 In mitral stenosis with back pressure and in congenital heart disease the shadows increase in area
- 4 Experiments by Garein Wasson *et alia* and by Assmann in dogs showed that the arteries have a different distribution to bronchi
- 5 Wengartner by means of wire introduced into the bronchi *in vivo* revealed the bronchi lying to the inner side of the vessels
- 6 Moniz and Lopo de Carvalho by introducing sodium iodide into the right auricle by way of a tube via an arm vein recorded great increase in the shadows
- 7 The tomograph supports the vascular nature of the shadows

Fig 772—SCALE FOR HILAR INVESTIGATION

I have been trying to perform the following for years but the absence of X ray plant in dissecting and post mortem rooms has prevented it. It would solve the vexed question for good and all

Take a piece of 22 gauge silver wire bend into a rectangle 20 x 12 cm and stitch on to a piece of stout cartridge paper. Bisecting the rectangle place two other pieces of the same wire. At intervals of 1 cm place fine (gauge 14) wires thus dividing the whole into 1 cm squares numbered from the stout intersecting wires left and right upper and lower

Fix the scale with drawing pins under a cadaver in such a way that the central vertical 0.0 is beneath the spinous processes and the horizontal 0.0 in the middle of the hilar opacity having previously determined that the shadows are well seen. Radiograph. Now run barium emulsion into the bronchi without moving the body and again radiograph. Now plot the outstanding markings on the first radiograph and check them over with the bronchograph. For example a mark noted say 1 cm to the right of the vertical line and 2 cm below the horizontal is compared with the bronchograph

Fig. 774 —ACTIVE TUBERCULOSIS. (See Fig 771)

Clinical History.—The disease had lasted four months. The general condition was poor, there being pyrexia and cough. Active disease was present in the whole of the right lung and the middle third of the left. Tubercle bacilli were found in the sputum.

Screen.—The diaphragm moved well.

Radiograph —A dense, woolly deposit is present in the upper two-thirds of the right lung and the middle third of the left. Near the hilum on the left side and some distance from it on the right are small cavities. The heart is large, but not displaced.

N.B —This film was inadvertently printed on the wrong side.

Tor-na-Dee Sanatorium

Dr J M JOHNSTON



FIG 77*

Figs. 776-779.—EARLY TUBERCULOSIS: A.P.T.: CURE. (See Fig 771)

Clinical History.—A girl, aged 21, with no family history of tuberculosis, complained of intermittent attacks of vomiting after meals. She had suffered from a cold associated with cough and malaise. She expectorated half an ounce of sputum daily, which was sometimes tinged with blood. There were no clinical signs, her temperature was 99°, weight, 9 st. 13 lb.

Radiographs.—Fig 776.—An area of infiltration is seen at the level of the second right rib, it is of recent origin, and represents a large cavity $1\frac{1}{2} \times 1\frac{1}{4}$ in. The left lung is normal.

Fig 777 (Seven weeks later).—A selective artificial pneumothorax has just been induced. The cavity appears suspended from the second rib by an adhesion; it is somewhat reduced in size.

Later History.—An abortion was induced as the patient was found to be pregnant, it was complicated by pyelitis. The temperature dropped to normal but patient had not put on weight, though she felt well.

Fig. 778.—A fibrotic area is seen in the second intercostal space, little trace of the cavity is visible.

Later History.—The patient felt well, had very small amount of sputum and no symptoms.

Fig. 779 (Fourteen months after onset).—The A P.T. is still present, the cavity site is marked by a slight opacity.

Dr G. RAMAGE

The letters "A.P." are very confusing in chest work. In view of the fact that these letters stood for "Anterior" and "Posterior" long before the birth of radiology, let alone artificial pneumothorax, it is desirable that the latter should carry the initials "A.P.T.," the "T" standing for "thorax," "treatment" or "therapy."

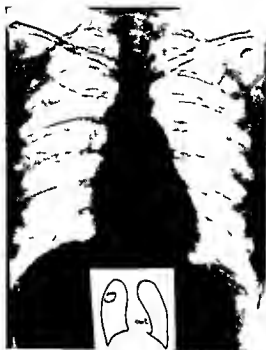


FIG 776



FIG 777

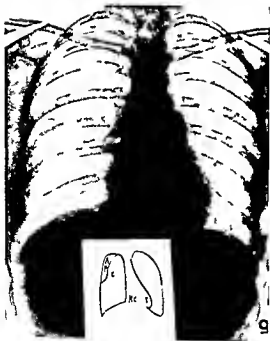


FIG 778



FIG 779

Fig. 780.—EARLY TUBERCULOSIS (See Fig 771)

Clinical History—Three months previously this woman, aged 24, had pleurisy, since when she was confined with the result that all her symptoms recurred.

Radiograph—The right chest is healthy with the possible exception of an area along the second rib. The left side shows a heavy infiltration below the clavicle in the area sometimes known as Assmann's focus, there is diminished air content in the apex.

Later History—An artificial pneumothorax resulted in great improvement.

Dr G. RAMAGE.

Fig 781 —AZYGOS LOBE (See Fig 771)

Discovered accidentally during examination.

Radiograph—To the right above the heart shadow, can be seen the azygos lobe.

F. TOLLEY

Dr HODSON.

Fig. 782 —EARLY TUBERCULOSIS. (See Fig. 771)

The man, aged 28, had been quite well apart from ailments in childhood until two months ago, when his appetite failed and he felt languid. Suddenly he felt a "pricking" over the precordium and he coughed up fifteen ounces of blood. For some time afterwards his sputum was "coloured."

On admission he was given calcium sandoz, 10 cc daily, which was continued for several days. There were crepitations below the right clavicle.

Radiograph—The right apex shows diminished radiolucency, the left lung is normal.

Subsequent History—An artificial pneumothorax completely arrested the disease. The A.P.T. has been maintained, occasionally the sputum is stained, but he is very well.

Dr G. RAMAGE.

Fig. 783.—ACUTE TUBERCULOSIS (See Fig 771)

Clinical History—The disease appeared four months previously in a woman of 28 lassitude being the predominant symptom.

Radiograph—Widespread bilateral infiltration is manifest, cavitation is present in both apices, on the left side a cavity has almost replaced the upper lobe.

Dr G. RAMAGE.

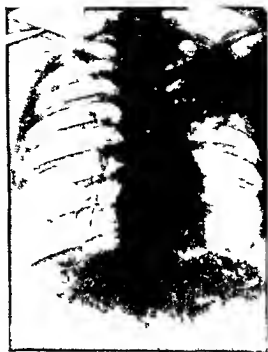


FIG 780



FIG 781

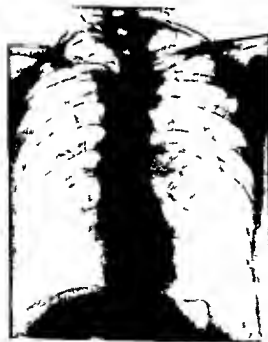


FIG 782



FIG 783

Fig. 784.—SPONTANEOUS PNEUMOTHORAX. (See Fig. 771)

Clinical History—This man, aged 40, gave a history of four years' chest trouble. Suddenly he felt a sharp pain in the right chest, accompanied by dyspnoea.

Radiograph—Much woolly infiltration of both lungs. On the right side is a large pneumothorax, bisecting which is a pyramidal section of lung which has been held out by an adhesion.

Later History—Three months later the air had almost disappeared from the pleural cavity. No tubercle bacilli were present in sputum, and the patient was discharged in good condition seven months later.

Dr G. RAMAGE

Fig. 785.—ARTIFICIAL PNEUMOTHORAX. (See Fig. 771)

Clinical History—A year and a half previously this woman experienced a sudden attack of pain in the left chest, which persisted for five weeks. It was accompanied by a cough, with sputum. Examination revealed unresolved consolidation of the left lower lobe. Tubercle bacilli were found. A pneumothorax was done.

Radiograph—A good collapse has been effected, the pleural cavity being obliterated from below upwards. The shrunken lung is readily identified.

Subsequent History—The pneumothorax was maintained for eighteen months. The patient was only moderately well, but lived at home, returning for refills.

Dr G. RAMAGE

Fig. 786.—HYDATID, LUNG. (See Fig. 771)

Radiograph—On the right side of the chest is a large spherical cyst full of secretion.

Dr L. A. ROWDEN

Fig. 787.—ARTIFICIAL PNEUMOTHORAX · PHRENIC EVULSION.

(See Fig. 771)

Clinical History—The man, aged 33, suffered from cough, loss of appetite and lassitude for eight years. Tubercle bacilli were present in sputum originally and at the present time. A left pneumothorax was induced four years previously, and a right phrenic evulsion three weeks later.

Radiograph—The right dome of the diaphragm is raised, the upper part of the lung shows increased density due to persistent disease. The heart is drawn over to this side. The left lung has collapsed to about half its normal size, due to the pneumothorax, there is a well-marked adhesion about the level of the third rib.

Later History—Patient felt much better, though tubercle bacilli were still present in the sputum. Apart from slight cough, he was symptom free, though not able to do any manual work.

Dr G. RAMAGE

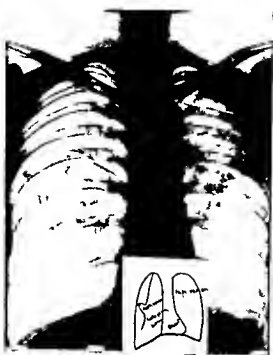


FIG 784



FIG 785



FIG 786



FIG 787

Figs. 788 and 789.—TUBERCULOUS PLEURISY. (See Fig 771)

Clinical History.—The woman, aged 27, had suffered from colds for five months, pyrexia was present.

Radiographs.—Fig. 788 —The classical description of “fluid creeping up into the axilla” is seen here to perfection. Had air been present the fluid would have had a horizontal upper level. Tubercle bacilli were found in the fluid withdrawn.

Treatment —Expectant throughout

Fig. 789 (Seven weeks after admission).—Complete resolution is apparent, the lung appears perfectly normal.

Subsequent History.—Since discharge she has been symptom free. Dr Cookson examined her one year later and found no clinical signs of disease apart from some pleural thickening.

Dr G. RAMAGE.

Figs. 790 and 791 —TUBERCULOUS PLEURISY. (See Fig. 771)

Clinical History.—A man, aged 21, was quite well until two weeks previously, when he developed a “cold” and pain in the left side, temperature 100°.

Radiographs.—Fig 790.—The left chest is almost completely filled with fluid, the upper limit of which is horizontal save at the periphery, where it creeps up into the axilla. The heart has become displaced somewhat to the right.

Treatment —Routine sanatorium and two aspirations comprised the treatment

Fig. 791 (Five months later).—There remains only the reduction of the left costophrenic angle to be seen. The heart has assumed its normal position. There is no sign of infiltration of the lung.

Subsequent History.—Was then working full time. Examination of the chest by Dr Cookson revealed nothing abnormal six months after the onset

Dr G. RAMAGE.



FIG 788



FIG 789



FIG 790



FIG 791

Fig. 792 —**BRONCHIECTASIS** (See Fig 771)

Clinical History.—An attack of hæmoptosis (5 oz.), after a period of lassitude and persistent cough with expectoration, led this woman, aged 46, to seek advice. Râles were present everywhere. A pregnancy terminated normally save for some œdema of the legs. At a later period she was coughing up four to six ounces of sputum daily; no tubercle bacilli found.

Radiograph—The whole chest presents a somewhat ground-glass appearance, there is a lack of sharpness about the lung fields. The left side is clearer than the right. At the right base are locular cavities suggesting bronchiectatic origin. No evidence of tubercle. The diagnosis from tuberculosis is often difficult without X-rays, hæmoptosis being common to both.

Dr G. RAMAGE

Fig. 793 —**BRONCHIECTASIS** (See Fig 771)

Clinical History.—A woman of 21 gave a history of long-standing cough and expectoration following pneumonia.

Screen—The outer half of the right side of the diaphragm moved well, but not the inner, whilst the left was almost immobile.

Radiograph—The inner and lower part of the right lung is opaque, owing to fibrosis and displacement of the heart, whilst the outer part is less obscure, partly because it is less diseased. Although the opacity does not involve the upper lobe its texture has disappeared. The left diaphragm is flattened laterally and shows angular deformity.

Scoliosis is present, approximating the ribs on the left side. The heart is drawn over, exposing the vertebræ, to the left of which appears the tracheal streak.

Remarks.—The ground-glass appearance of the affected lung is very characteristic.

Vale of Clwyd Sanatorium

Mr H. MORRISTON DAVIES



FIG 792



FIG 791

Fig. 794.—PYOTHORAX: PNEUMONIA. (See Fig. 771)

Clinical History.—A boy of $7\frac{1}{2}$ was admitted on 8.2.47 as an acute appendix. On 24.2.47 a subphrenic abscess was diagnosed, fluoroscopy revealed absence of movement of the right side of the diaphragm. On 7.3.47 fluid, rapidly becoming purulent, was detected in the right pleural cavity. A hæmolytic streptococcus was found.

Radiograph (Oblique Horizontal).—A sharply defined fluid level is visible extending from the clavicle above to the seventh rib below, where it merges into the liver. Compared with the left side the lung is distinctly opaque, due to pneumonia.

After-History.—Surgical drainage resulted in a perfect cure.

F TOLLEY

Dr HOLMES WATKINS





Fig 201

Figs. 795 and 796.—BRONCHIECTASIS: LIPIODOL

Clinical History—A woman, aged 29, had pneumonia in 1915 and 1918. In 1920 she began to cough up offensive, ruddy sputum; there was some malaise but the physical signs were indefinite.

Screen—Diminished translucency present at the left base.

Radiograph.—Indefinite.

Fig 795 (After lipiodol)—“Glove”-shaped dilatation of the bronchi is seen on the left side: the right appears normal.

Treatment.—An artificial pneumothorax was induced on the left side, with good collapse; this was followed by phrenic evulsion, with successful rise of the diaphragm. An oleothorax was then performed.

Fig. 796 (After further introduction of lipiodol).—Some diminution in size of bronchi is apparent. The diaphragm is well elevated and above it is a layer of oil beneath a fluid level.

After-History.—The patient has little sputum and is otherwise quite well. The oleothorax is controlled by a monthly induction.

Cheshire Joint Sanatorium

Dr PETER W. EDWARDS.

Figs 797 and 798 —BRONCHIECTASIS: LIPIODOL

Clinical History.—A woman, aged 21, had a cough accompanied by sputum since 7, and was kept from school with the diagnosis of “bronchitis.” The sputum was offensive and often coloured. There was considerable dyspnoea. The left chest was dull to percussion and there were some rhonchi.

Screen.—The whole of the left chest was opaque.

Radiographs.—Fig. 797 (Recumbent).—The left chest is uniformly opaque except for patches of lipiodol which show as darker areas, extending up as far as the clavicle. The lipiodol streaks of the left chest are normal.

Fig. 798 (Erect)—Shows air intermixed with the lipiodol.

After-History.—The operation of pneumectomy or thoracoplasty is being considered.

Cheshire Joint Sanatorium

Dr PETER W. EDWARDS.



FIG 795

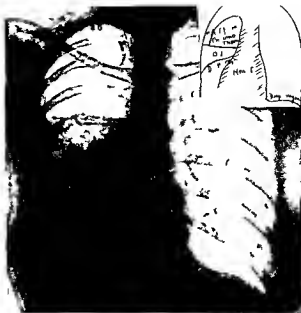


FIG 796



FIG 797



FIG 798

Fig. 799-801.—ACUTE LOBAR PNEUMONIA (See Fig 771)

Clinical History—This man, admitted on 15.6.47, gave a history of four days' illness starting with shivering, followed by back and head aches and profuse sweating. He had pain in the right chest, difficulty in swallowing and occasional rigors. Temperature 104 degrees F. Bronchial breathing and increased vocal resonance were present over the whole of the upper right lobe.

Radiographs (16.6.47)—Frontispiece.

Fig 799 (23.6.47)—Considerable resolution, especially as regards the middle lobe, has occurred. There is some increase of density of the left upper lobe.

Fig 800 (1.7.47).—The right lung has cleared almost entirely, the left completely.

Fig 801 (22.7.47)—Both lungs are quite clear but there is a suggestion of an increase in hilar density.

F. TOLLEY

Dr HOMER S. WATKINS

Fig. 802.—BRONCHOPLEURAL FISTULA. (See Fig 771)

Clinical History.—The woman, aged 21, had pneumonia, followed by empyema, in May 1938. For the latter a rib resection and drainage were instituted. She was discharged in October with a sinus which pocketed up, then poured pus intermittently. In November she was in a poor state of health, the movements of the left chest were limited, and dull on percussion. In December the sinus was explored and the cavity enlarged by further rib resection; a piece of drainage tube was removed. A Tudor Edwards' tube was fitted, giving closed drainage. In a month's time the patient was very well and the cavity was smaller. One month later the patient relapsed, having developed a bronchopleural fistula. A bronchogram was attempted, but failed owing to coughing.

Radiograph—This shows the syringe, charged with lipiodol, discharging its contents towards the bronchus, one of which is readily recognised above, and two below, the fistula. There is considerable mottling of the lung about the site of injection, possibly due in part to previous injection of opaque medium. The trachea is displaced to the right.

Subsequent History—By April 1939 the sinus had healed and she was very well. Further inquiries made in July revealed that she was healthy.

Mr W. B. R. MONTGOMERY

Mr G. A. BAGOT-WAITERS.



FIG 799



FIG 800

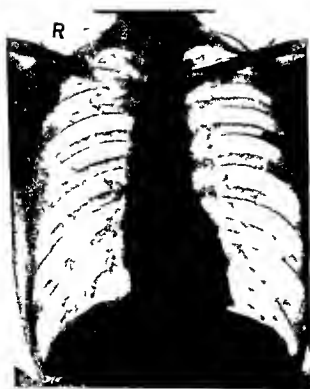


FIG 801



FIG 802

Fig. 803.—SPONTANEOUS PNEUMOTHORAX. (See Fig. 771)

Clinical History.—A long-standing case of pulmonary tuberculosis with positive sputum and laryngitis.

Radiograph.—The right upper lobe shows infiltration. The left upper lobe would have collapsed completely but for the presence of a stout adhesion to the first rib, having the appearance of a bell-tent. The condition was symptomless, being discovered only on X-ray examination.

Dr G RANAGE.





FIG 803

Fig. 804.—ACTIVE TUBERCULOSIS. (See Fig. 771)

Clinical History—The man, aged 33, had been coughing up sputum for a year, in spite of which he had been working until one month before examination, when he felt lassitude and dyspnoea

Radiograph (Right upper lobe shown on larger scale) —The whole lung is heavily infected with cavitation at the apex

Dr G. RAMAGE

Fig. 805.—CHRONIC TUBERCULOSIS (See Fig. 771)

Clinical History—A woman aged 42, who had a positive sputum for thirteen years persisting until the present time. She had indigestion, but assisted in the sanatorium shop four hours a day

Radiograph—The disease is definitely limited to the right side, which shows diminished radiolucency above and absolute opacity below. The heart is drawn over to the diseased side. There is a large cavity containing fluid visible under the clavicle

Dr G. RAMAGE.

Fig. 806.—EMPHYSEMA. (See Fig. 771)

Radiograph.—The typical barrel chest of emphysema is apparent. The bronchial shadows are well marked in the lower part of the film, and are obviously not due to blood vessels. The heart is narrow and air is visible between it and the diaphragm. The whole lung field is more transparent than normal. Ribs are horizontal. The heart is small due to decreased venous return, rotation and increased width of chest are noticeable. The costo-phrenic angle is greatly increased. The pulmonary conus is prominent

Dr G. RAMAGE

Fig. 807.—PULMONARY SPIROCHÆTOSIS CASTELLANI. (See Fig. 769)

Clinical History—A woman had, for seven years, complained of copious foetid sputum, but her general condition was good. Physical signs suggested tuberculosis, with cavity formation of the right upper lobe. The sputum contained many spirochætes—confirmed by two bacteriologists—but no tubercle bacilli. Von Pirquet's reaction and complement-fixation were both slightly positive, the Wassermann was negative

Scicen—The right side of the diaphragm was high and its movement restricted

Radiograph—There is considerable "roof tilting" of the right upper lobe, with infiltration of the lung near the apex, and an appearance suggestive of a thick-walled cavity. Dense nodules at each hilum indicate healed tuberculosis

Tor-na-Dee Sanatorium

Dr J. M. JOHNSTON.



FIG 804



FIG 805



FIG 806

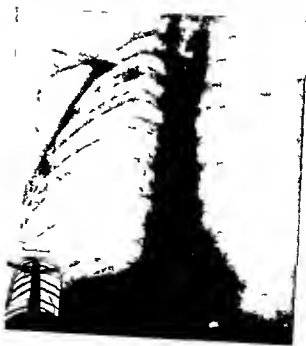


FIG 807

Figs. 808 and 809—BASAL PHTHISIS: PHRENIC EVULSION. (See Fig 771)

Clinical History—A man, aged 19, had hæmoptysis and much sputum; tubercle bacilli were present. Râles were present throughout the right base, also peetonloquy. Clinically there were signs of a cavity at the right base.

Screen.—Lighting up was good above but poor at the base.

Radiograph (P.A.).—Fig. 808.—A large cavity is seen at the right base, with opacities surrounding it.

Treatment.—Artificial pneumothorax was tried but failed, so phrenic evulsion was performed.

Radiograph (P.A.).—Fig. 809 (15 months later).—The diaphragm is well raised, and the lung visible shows none of the fuzziness seen in the right base in the previous picture.

After-History.—The sputum became negative, he gained 20 lb. in weight, and is now at work. There is still a slight cough due to fibrosis, no other symptom.

Cheshire Joint Sanatorium

Dr PETER W EDWARDS

Figs 810 and 811—RESULT OF THORACOPLASTY (See Fig 771)

Clinical History.—A man, aged 38, was bedridden with a remittent fever. Numerous tubercle bacilli were found in the sputum.

Radiograph—Fig. 810.—The left chest is almost free from disease. The heart shadow is small and little is seen to the left. The tracheal streak is also drawn over to the right. The right chest reveals extensive disease. The upper lobe is very opaque; at the base is a large collection of fluid with a characteristic fluid level, and between there is a radiolucient area due to gas.

Operation.—An upper thoracoplasty was done, together with open drainage for the empyema, with the result that tubercle bacilli disappeared from the sputum. A radiograph taken one month after operation showed considerable lightening of the upper lobe opacity.

Second Operation.—Total thoracoplasty performed.

Radiograph—Fig. 811 (6 months after admission).—The whole of the right chest has fallen in. The tracheal streak and heart are taking up a more normal position, released from the drag of the diseased lung.

Final Result.—The sputum remained negative and he was able to do light work. The empyema cavity became obliterated.

Late Mr L. O'SHAUGHNESSLY

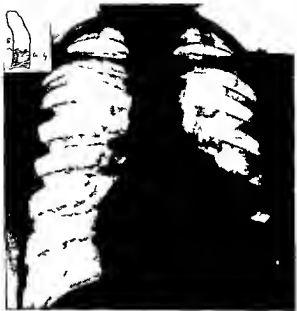


FIG 808



FIG 809



FIG 810



FIG 811

Figs 812-819.—ARTIFICIAL PNEUMOTHORAX. (See Fig. 771)

Clinical History—At the age of 33 this woman had an attack of measles, in late 1941, from which she made a complete though protracted recovery. Then she began to lose weight, developed lassitude and a cough.

Artificial pneumothorax was successfully performed; no adhesions were encountered. Refills were kept up for twelve months; latterly only small refills were induced to date. There was only one period of pyrexia, fluid appearing on the affected side. She was not treated in a sanatorium.

Fig. 812 (31.8.43).—There is a large cavity just outside the lung root on the right side, where a marked opacity is seen.

Fig. 813 (6.9.43).—Artificial pneumothorax has been induced successfully, evidenced by lung-marking disappearing. The walls of the cavity are collapsing.

Fig. 814 (15.9.43).—Cavity still further reduced

Fig. 815 (22.10.43).—Lung completely collapsed and cavity obliterated.

Fig. 816 (13.12.43).—Lung is still collapsed, but fluid has appeared, reaching up to the lung root.

Fig. 817 (11.2.44) (inadvertently printed wrong side).—Collapse still holds, but fluid has increased in amount. The lung is becoming adherent to chest wall.

Fig. 818 (14.4.44).—The fluid has become absorbed, but the lung is adherent to the base, pneumothorax still exists, though lung is expanding.

Fig. 819 (29.5.44).—Lung has continued to expand.

After-History—She is still having refills, but is symptom free and doing well.

Late F. H. FRIER.

Dr E. HOLMES WATKINS.

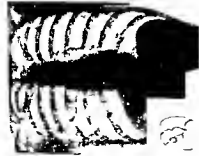


FIG 812

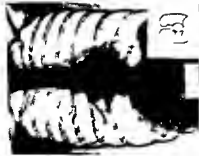


FIG 813



FIG 814



FIG 815



FIG 816



FIG 817



FIG 818



FIG 819

Figs 820-825.—ARTIFICIAL PNEUMOTHORAX. (See Fig 771)

Clinical History—Lassitude, cough, expectoration—with some blood—loss of weight and sweating began two months before. Physical signs of active disease were present in the right upper lobe, especially behind, along the septum. No cavities were detected.

Screen—Diaphragmatic movement was free; the apices were clear.

Radiographs.—Fig 820 (On admission).—A thick, triangular band, with its apex at the hilum, stretches to the lateral chest wall. The appearance suggests interlobar pleural thickening, with tuberculous deposits up to the clavicle and involving also the left hilum. The patient did not improve rapidly, so pneumothorax was decided upon.

Fig 821.—Two refills of gas (600 cc.). The upper lobe has retracted from the chest wall. A thickened band is seen at the base of this lobe and a large cavity in its midst. The lower lobe is unaffected.

Fig. 822.—Fourth refill (1450 cc.). Further collapse in the lobe has occurred, the lower one is unaltered.

Fig 823.—Eighth refill. The lower lobe has separated somewhat from the chest wall

Fig. 824.—Later stages. The upper lobe is well collapsed, the lower one unaltered.

Fig. 825 —Final stage. Upper lobe is completely shrunk, whilst the lower one is slightly collapsed, though physical examination demonstrated the presence of gas surrounding it, save at the diaphragm.

Result.—The patient did very well, leaving hospital in good general health, without cough, expectoration or fever.

Tor-na-Dee Sanatorium

Dr J. M. JOHNSTON



FIG 820



FIG 821



FIG 822



FIG 823



FIG 824



FIG 825

Figs 826 and 827.—PHTHISIS: PHRENIC EVULSION. (See Fig 771)

Clinical History—A man, aged 20, a cotton operative, complained of distressing cough accompanied by much sputum and also hæmoptysis. Tubercle bacilli were found in the sputum. An artificial pneumothorax controlled one hæmorrhage and he returned to work. The pneumothorax was obliterated by the next year. Two severe hæmoptyses occurred.

Radiograph (P.A.)—Fig. 826.—The right chest is very dense, especially at the periphery

Treatment—Phrenic evulsion three years after A.P.T

Radiograph (P.A.)—Fig. 827.—There is a fairly satisfactory rise in the diaphragm. Multiple calcified areas are seen near the mediastinum and also in the right lung.

After-History.—He had been on full work as a labourer, and symptomless, since the phrenic evulsion.

Cheshire Joint Sanatorium

Dr PETER W. EDWARDS

Figs. 828 and 829.—ARTIFICIAL PNEUMOTHORAX: PHRENIC EVULSION.

(See Fig 771)

Clinical History—A man, aged 51, had irregular temperature and a positive sputum test.

Radiograph (P.A.)—Fig. 828.—This shows a heavy infection of the right upper lung, with a cavity in the infra-clavicular fossa. This woolly appearance is invariably encountered in cases of active disease.

Treatment—Artificial pneumothorax was induced on account of the cavity. There was some fluid and considerable basal movement. Phrenic evulsion performed.

Radiograph (P.A.)—Fig. 829.—The diaphragm is well elevated on the right side, the cavity has undergone calcification as a result of the relief of tension. Full collapse is prevented by an adhesion near the clavicle.

After-History.—He was discharged after two months, and has since been symptomless and doing full work.

Cheshire Joint Sanatorium

Dr PETER W. EDWARDS



FIG 826

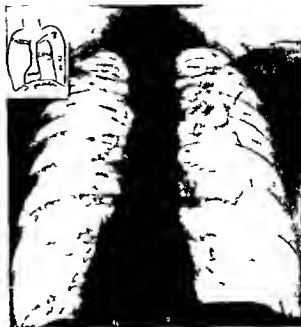


FIG 827



FIG 828



FIG 829

Figs 830 and 831.—MASSIVE PHTHISIS: PHRENIC EVULSION. (See Fig. 771)

Clinical History—A man, aged 27, was admitted with cough and many tubercle bacilli in the sputum. He had dyspnoea and malaise. Physical signs included numerous bubbling râles and whispering pectoriloquy in the infra-clavicular and mid area of the right chest. The left was comparatively clear.

Radiograph (P.A.).—Fig. 830.—The whole of the right chest shows diminished radiolucency and fluffy areas everywhere. The left side is almost clear.

Treatment.—Artificial pneumothorax was unsuccessful, so phrenic evulsion was performed.

Radiograph (P.A.)—Fig. 831 (2 years later)—The diaphragm has risen well up into the thorax and the lung has become free of the fluffy areas seen in the previous skiagram.

After-History—The sputum became negative, contraction occurred rapidly and he has been at full work since.

Cheshire Joint Sanatorium

Dr PETER W EDWARDS.

Figs 832 and 833 —ARTIFICIAL PNEUMOTHORAX: MEDIASTINAL FLOP AND HERNIA. (See Fig. 771)

Clinical History.—The artificial pneumothorax was performed on the right side in a youth of 19. Readings -12 to -7 at the start and -7 and -2 at the end were recorded. They were never positive.

Screen.—The mediastinum was freely movable for four months, and a hernia was seen in the first five spaces.

Radiograph (P.A.)—Fig. 832 (Full expiration)—With the exception of an adhesion above, good collapse is visible. The mediastinum is slightly over to the left. A well-defined area is seen to the left of the heart shadow.

Radiograph (P.A.).—Fig. 833 (Full inspiration)—The mediastinum is drawn well over to the left, exposing thereby much less of the collapsed lung. The hernia extends to within an inch of the chest wall.

Cheshire Joint Sanatorium

Dr PETER W EDWARDS



FIG 830



FIG 831



FIG 832



FIG 833

Figs. 834-837 —ARTIFICIAL PNEUMOTHORAX: MEDIASTINAL FLOP AND HERNIA.
(See Fig. 771)

Clinical History —A man, aged 22, had a pneumothorax done which ran a normal course for six weeks, the readings being negative -9 to -0 , without becoming positive

Screen —The mediastinum showed considerable movement and a hernia at the third interspace.

Radiograph (P.A.).—Fig. 834 (Full expiration) —The lung on the right side is seen partially collapsed; the heart shadow is drawn to the left side. Beyond the area of cardiac opacity in the second and third spaces is the hernia, and lung is visible between vertebral column and heart.

Radiograph (P.A.).—Fig. 835 (Full inspiration) —Although the cardiac shadow has moved to the left there is still a slight hernia present. The collapsing lung is dragged over to the chest wall.

Treatment.—100 cc. of gomenol were injected, with the result that the mediastinum stiffened.

Radiograph (P.A.).—Fig. 836 (2 months later) (Full expiration).—The cardiac shadow is not so far to the left as previously, and the hernia has disappeared.

Radiograph (P.A.).—Fig. 837 (Full inspiration).—No trace of hernia visible, nor is right lung displaced to left. The oil is visible on the right side in both radiographs.

After-History —Patient is gaining weight; he attends for refills.

Cheshire Joint Sanatorium

Dr PETER W EDWARDS.



FIG 834

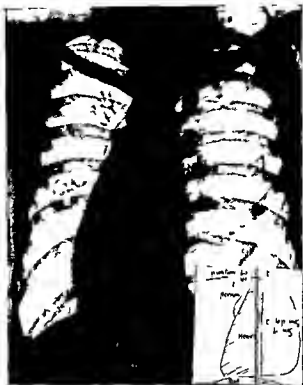


FIG 835



FIG 836

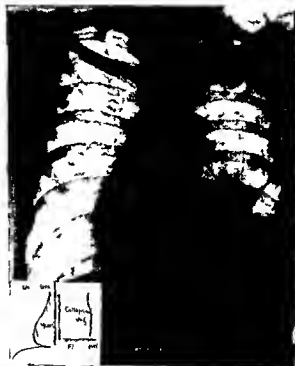


FIG 837

Fig. 838.—THORACOPLASTY. (See Fig. 771)

Clinical History—Tuberculosis was first recognised eleven years ago, following a profuse hæmoptosis, in a man now aged 45. X-rays revealed infiltration and cavitation in the right upper lobe, together with infiltration of the left apex. Bacilli were present in the sputum. A right A.P.T. was started in 1938 but adhesions held open the apical cavity, about the same time a left A.P.T. was instituted. By 1939 the right A.P.T. was beginning to have effect, started by an effusion, later it was abandoned on the right but continued on the left. In 1942 thoracoplasty was performed at the Brompton Hospital. He left hospital three months later, his left A.P.T. has been continued, progress has been good but tubercle bacilli are still present in the sputum.

Radiograph—The whole of the upper part of the right chest has fallen in exposing almost all of the scapula, there is some pleural thickening over the lower lobe. There is thickening of the left apex and upper lobe. The heart has been drawn somewhat to the right.

After-History—Seen in February 1947 he was feeling well and working on the land. There was still a morning cough and positive sputum.

F. TOILEY

Dr H. B. HODSON.

Fig. 839.—THORACOPLASTY. (See Fig. 771)

Clinical History—A soldier who was taken prisoner at Dunkirk, had been a P.O.W. for over three years and was repatriated in February 1943, whilst under treatment for a G.S.W. Six months later he had an unsuccessful A.P.T. performed in a sanatorium, so a thoracoplasty was done, in two stages.

Radiograph—A right upper-stage thoracoplasty is revealed, from the fourth rib anteriorly and upwards a mere ribbon of lung is visible.

After-History—In spite of a slight morning cough he now feels well two years after operation. The sputum was negative and the erythrocyte sedimentation rate 1 mm. in one hour.

F. TOILEY

Dr H. B. HODSON.

Figs 840 and 841.—THORACOPLASTY. (See Fig. 771)

Clinical History—Tubercle bacilli had been found in sputum two years before and on admission her general condition was very poor. There was active disease of the whole of the right lung, with cavity formation in the upper lobe.

Radiograph—Fig. 840 (On admission)—The whole right lung is affected, a cavity is seen behind the clavicle. Old disease is present in the left apex.

Operation—Artificial pneumothorax was attempted, unsuccessfully as, owing to adhesions, no pleural space was discovered. She went from bad to worse, so thoracoplasty was decided on and done by the late Sir Henry Gray.

Radiograph—Fig. 841 (8 months after operation)—Note the absence of ribs. Effectual collapse of the chest wall and lung has occurred.

Result—The patient has been comparatively well, and tubercle bacilli have not been found since operation.

Tor-na-Dee Sanatorium

Dr J. M. JOHNSTON.



FIG 838



FIG 839



FIG 840



FIG 841

Figs. 842 and 843.—FIBRIN BALL: ARTIFICIAL PNEUMOTHORAX. (See Fig. 771)

Clinical History—A woman, aged 27, had an artificial pneumothorax performed, and four months later developed a small puddle of fluid which in the course of five months became consolidated. At first it was freely movable in the pleural cavity, but later it anchored itself to the posterior wall.

Radiographs (P A)—Fig. 842—The ball of fibrin is seen in the costophrenic space.

Fig. 843 (11 months later)—The mass has anchored itself to the posterior wall of the chest.

Cheshire Joint Sanatorium

Dr PETER W. EDWARDS.

Fig. 844.—UNRESOLVED PNEUMONIA. (See Fig. 771)

Clinical History—A baby 8 months old (looking like 3 months), had "pneumonia" at two months and had lost weight. Temperature 103, pulse 160; respiration 48-64.

Radiograph—The right chest is opaque as far up as the third rib, save for a slight clarity immediately lateral to the ribs. The apex is very clear, but lung-markings rule out a pneumothorax.

After-History—The exhibition of 6½ grains of sulphapyridine brought down the pyrexia in three days, but the child failed to pull round. A post-mortem was not sanctioned.

Late F. H. FRIER

Dr E. HOLMES WATKINS.

Fig. 845.—INTERLOBAR EMPYEMA. (See Fig. 771)

Clinical History—This man, aged 47, had "cold upon cold" for three months. He had lost two stones and had a severe cough, bringing up very purulent sputum. He was sweating at night profusely and had shortness of breath. He was in a N. A. A. F. I. canteen, necessitating his being always "on the move."

Radiograph—On the left side is a broad, linear opacity in the region of the interlobar septum where the pus is.

After-History—Made an uneventful recovery.

Late F. H. FRIER

Dr E. HOLMES WATKINS.



FIG 842

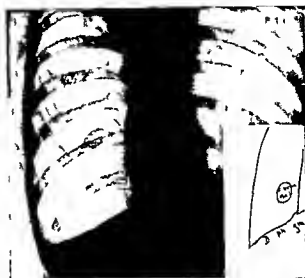


FIG 843



FIG 844

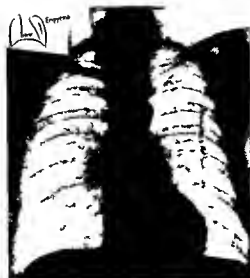


FIG 845

Fig. 846.—UNRESOLVED EMPYEMA. (See Fig 771)

Clinical History—On screening the chest during routine examination an opacity was found and radiographed. There was no history of pulmonary complaints though there was some old calcification.

Radiograph.—A dense opacity occupies the lower right chest, it tends to pass upwards towards the axilla laterally. The costo-phrenic angle is wide open.

N.B.—Compare with Fig 847: Lung Abscess.

Late F H FRIER

Dr E HOLMES WATKINS

Fig. 847.—LUNG ABSCESS. (See Fig 771)

Clinical History.—A youth, aged 20, was admitted with a vague history of some cough and sputum. The following day it was noticed that he was bringing up offensive sputum. Clinical examination merely revealed a flat note on percussion over the left base.

Radiograph (Upright)—A somewhat wedge-shaped opacity is visible a little above the diaphragm, due to fluid which has a sharply defined fluid-level, above which is gas

Subsequent History—Needling to a depth of $2\frac{1}{2}$ inches resulted in the withdrawal of 2 cc of very foul fluid, which, in addition to the usual flora, contained *B. pyocyaneus*. After allowing an interval of ten days in order that adhesions might form, the abscess was explored and drained. Recovery was uneventful.

N.B.—Compare with Fig. 846: Empyema

Late F H FRIER

Dr E HOLMES WATKINS

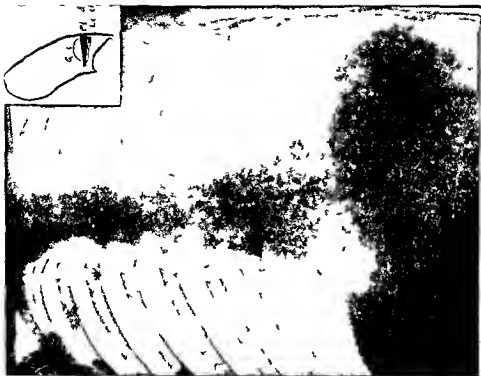


Fig 847



Fig 846

Fig. 848.—CARCINOMA LUNG. (See Fig 771)

Clinical History—A marine engineer from abroad, aged 45, complained of severe sweating at night for the last three months, accompanied by lassitude. Apart from a few moist sounds in the right chest, and a few fine crepitations in the upper part of the right chest, very few signs were detected. His temperature varied between 98° and 102°.

Radiograph—Above the heart shadow is a large, rounded mass extending up into the neck. Its uniformly rounded appearance would suggest aneurism were it lower in position. The trachea is displaced to the right. No fluid is present. One large area and one small area of calcification are seen in line with the second rib on the right side.

Autopsy—An oat-celled carcinoma was found.

Dr E HOLMES WATKINS

Fig. 849.—CARCINOMA LUNG. (See Fig 771)

Clinical History—This man, aged 61, was quite well until March 1947, when he began to feel "off colour," he was losing weight and had pain in the back. During the last month a slight cough had developed, associated with some discomfort of the left chest. A sister and brother had died of pulmonary tuberculosis.

Radiograph—Occupying the whole of the upper left lobe of the lung is a dense, rounded growth. Involvement of the phrenic nerve has resulted in paralysis of the left leaf of the diaphragm.

F TOLLEY

Dr E HOLMES WATKINS

Fig. 850.—SARCOMA FOLLOWING PHTHISIS. (See Fig. 771)

Clinical History—The patient complained of slight cough, expectoration, and pain in the right chest for four months. He had lost weight and suffered from shortness of breath and fever. There were slight dullness and crepitations of the right apex. Marked dullness and absence of breath sounds were noted over the right base. Exploration with a needle procured some turbid fluid containing many polymorphs. Tubercle bacilli were found, with difficulty, in the sputum. Leucocytosis was present.

Screen—The right side of the diaphragm was immobile.

Radiograph—On the right side is a great increase of hilar opacity. The diaphragm is greatly elevated due to phrenic involvement.

Remarks—The diagnosis rested between mediastinitis and malignant disease, the latter being decided upon. Before death there was blood-staining of the sputum and stridor.

Tor-na-Dee Sanatorium

Dr J M JOHNSTON

Fig. 851.—CARCINOMA LUNG. (See Fig 771)

Clinical History—For fifteen months the man had lost weight and now showed severe toxæmia. There was great flattening and absolute dullness of the left chest, with cardiac displacement, no tubercle bacilli were found.

Radiograph—The left lung is uniformly opaque, the mediastinum and trachea are drawn to the left.

Result—Autopsy, three months later, showed the whole of the left lung to be adherent. It was honeycombed with purulent cavities resembling tubercle, but, microscopically, they were endothelioma, some tubercles were present.

Tor-na-Dee Sanatorium

Dr J M JOHNSTON



FIG 848



FIG 849



FIG 850



FIG 851

Figs. 852 and 853.—**EMPYEMA: FOREIGN BODY.** (See Fig. 767)

Clinical History.—A boy, aged 11, was operated on eight years before for empyema. Though the sinus healed there was such copious and foetid sputum that the boy was not admitted to school. An attempt was made to remove a foreign body at a general hospital. On admission to the sanatorium, one year later, there was abundant sputum, anorexia and dyspnoea: no tubercle bacilli were found.

Radiograph.—Fig. 852 (P.A.).—A drainage tube is seen related to the second, third and fourth ribs. Pus is tracking up towards the axilla from the costo-phrenic angle.

Operation.—Mr Morrison Davies removed parts of six ribs and extracted a friable rubber tube which was embedded in dense pleural tissue. Suction drainage and irrigation were instituted. The resulting bronchial fistula and external wound soon healed, and the boy is now symptomless.

Radiograph.—Fig. 853 (P.A.) (After operation).—The dark patches are the remains of lipiodol. The lung is expanding.

Cheshire Joint Sanatorium.

Dr PETER W. EDWARDS

Figs. 854 and 855.—**CARCINOMA, PLEURAL EFFUSION: GAS REPLACEMENT.**
(See Fig. 771)

Clinical History.—A man, aged 56, complained of pain in his left side and breathlessness: he felt some malaise. There was slight cough and some sputum: tubercle bacilli were not found.

Radiograph.—Fig. 854 (P.A.).—The whole of the left chest is opaque: the heart is pushed towards the right.

Radiograph.—Fig. 855 (P.A.) (Taken half an hour later, after replacement).—The lung has collapsed to about half its volume: the upper part appears unduly dense and proved to be the seat of a columnar carcinoma. The mediastinum has regained its normal position. (Some surgical emphysema developed and spread to the neck.)

N.B.—Gas replacement is most useful in determining the cause of an effusion. Any quantity can be rapidly removed, air replacing the fluid withdrawn: as much as 5500 cc. of pus have been evacuated by this means, with instant relief to the patient.

Cheshire Joint Sanatorium.

Dr PETER W. EDWARDS



FIG 852



FIG 853



FIG 854

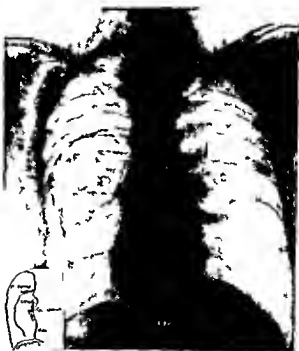


FIG 855

Fig. 856.—MEDIASTINAL LYMPHADENOMA. (See Fig. 771)

Clinical History—A man, aged 25, gave a history of a cough, with little expectoration, which had lasted three years. Recently he experienced indigestion and diarrhoea accompanied by night sweats and pyrexia. The left chest was dull and percussion showed deficient air entry, a pleural rub was heard.

Screen—Marked opacity about the upper part of the mediastinum. The left section of the diaphragm moved opposite to the right, indicating paralysis due to interference with the phrenic nerve.

Radiograph—An irregular radiating shadow caused by a tumour is seen at the hilum of the left lung. On the right side is a general increase in the mediastinal shadow.

Subsequent History—With rest and deep X-ray therapy the pyrexia and cough disappeared and the shadow decreased in size. After two months symptoms returned and increased until death, ten months later.

Autopsy—The anterior mediastinum and hilum of the left lung were involved in a growth which had ulcerated into the upper bronchus. The posterior mediastinum was a mass of secondaries, which were found also in the pleura and heart, where there was one the size of a walnut. Microscopically it was a lymphadenoma showing fibrosis and degeneration, it may have been thymic in origin.

MR O. A. MARXER

SIR EDMUND SPRIGGS

Fig. 857.—LYMPHADENOMA. (See Fig. 771)

Clinical History—Symptoms began fifteen months previously, when the condition was thought to be tuberculous. There was a cough with scanty sputum, which was occasionally blood-stained, and pain in the left chest and slight pyrexia. Dullness was present over nearly all the left lung, with faint breath sounds, and a few râles at the apex. The left cervical and axillary glands were enlarged; one was excised and proved to be lymphadenoma. Sputum showed absence of tubercle bacilli. Von Pirquet reaction and complement-fixation were positive.

Screen—A non-pulsatile swelling was seen, occupying and extending beyond the mediastinum. The diaphragm was high and moved badly.

Radiograph—A large shadow, extending widely into the left side and to a less degree on the right, occupies the mediastinum.

Result—Death occurred one year later; no autopsy.

Tor-na-Dee Sanatorium

DR J. M. JOHNSTON



FIG 837



FIG 838

Fig 858 —CARCINOMA LUNG. (See Fig. 771)

Clinical History.—A man, aged 66, had pneumonia of the right lung eleven months before, from which he apparently recovered, though the upper part of the lung remained opaque to X-rays. Three months before admission he suddenly felt ill and vomited, since then he has been weak and breathless.

Radiograph —The upper part of the right chest is contracted and the lung opaque, being occupied by new growth. The diaphragm is raised and its outline irregular, indicating the presence of adhesions, or phrenic nerve paralysis.

Autopsy —The stomach was found to be malignant.

N.B.—Certain French writers have recently drawn attention to the development of gastric cancer after influenzal pneumonia.

Mr O A MARXER

Sir EDMUND SPRIGGS.

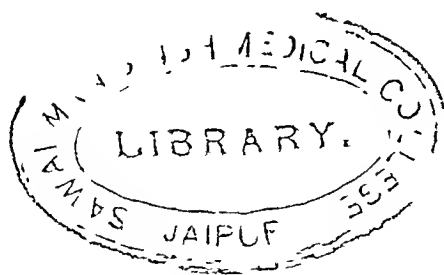




FIG 858

LIPIODOL INJECTIONS

“Aucun danger, aucune douleur”¹—Late Professor SICARD

Figs. 863-865.—NORMAL THECA

The radiographs were taken the day after 1 cc of lipiodol had been injected into the subarachnoid system by way of the atlanto-occipital space.

Fig 863 (Supine)—The solution has passed downwards until arrested by the cul-de-sac of the dura opposite the second sacral vertebra

Fig 864 (Lateral) Similar to 863

Fig 865 (Prone)—The solution has gravitated slightly, leaving traces at the exit of nerves

L'Hôpital Necker

Late Prof JEAN A SICARD

Figs. 866 and 867.—SPINAL TUMOUR. (See Figs. 863-865)

Radiographs (1 cc lipiodol).—The solution has become arrested in the dorsal region, its lower limit being the eighth disc. Its lower margin is very clearly defined, the upper one is not so sharp

Operation—M Robineau found an extradural tumour at the level of the eighth dorsal vertebral disc. It was removed and proved to be a neuroglioma.

Result—Complete recovery

L'Hôpital Necker

Late Prof JEAN A SICARD

Figs. 868 and 869 —SPINAL TUMOUR. (See Figs. 863-865)

History—The patient had thyroid cancer.

Radiograph (1 cc lipiodol)—Fig 868 —The solution is arrested at the level of the fifth cervical disc.

Treatment—A course of ten exposures to deep X-rays was instituted

Radiograph (After treatment)—Fig 869 —The subarachnoid space has become partially patent allowing some solution to pass downwards

Result—Considerable diminution in symptoms followed

L'Hôpital Necker

Late Prof JEAN A SICARD

Figs. 870-872.—SPINAL TUMOUR. (See Figs. 863-865)

Radiograph (1 cc lipiodol)—Unlike Figs 866 and 867 it is the upper limit which is sharply cut. The stoppage occurs opposite the first dorsal vertebra

Operation—At operation M Robineau found an extradural tumour in the predicted situation which was removed. It proved to be an angiofibroma

Result—A cure ensued

L'Hôpital Necker

Late Prof JEAN A SICARD

¹ It is essential, however, that the solution shall have retained its yellow colour and not turned black.

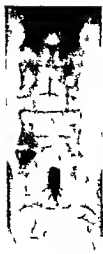


FIG 868



FIG 864



FIG 865



FIG 866



FIG 867



FIG 868



FIG 869



FIG 870



FIG 871



FIG 872



FIG 873



FIG 874



FIG 875



FIG 876



FIG 877

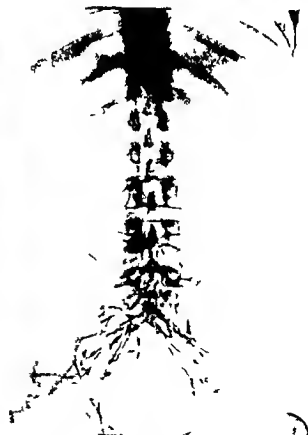


FIG 878

Fig. 855.—HYDROCEPHALUS

The lateral ventricle has been tapped, fluid withdrawn and replaced by air.

Ventriculograph.—The lateral ventricles are enormously distended, especially the left, which is represented by the larger radiolucency. The fact that air has entered both ventricles indicates that the obstruction is caudal to the third ventricle. Note the “beaten copper” markings of the skull so characteristic of increased intraerameal tension.

Dr R. W A SALMOND.

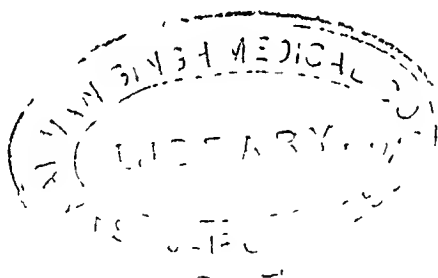




FIG 879

Figs. 880 and 881.—LUMBAR SPINA BIFIDA

Clinical History—A twin, aged 5 weeks, was admitted to the General Infirmary at Leeds with a large thin-walled meningocele in the lumbar region. Both legs were paralysed, the one quite flaccid, the other showing some resistance to movement. There was a suspicion of condylomata in the anal region, and the facies further suggested a syphilitic taint, but the family history was good, and the other twin to all appearance healthy.

At operation all the lumbar laminae were found wanting and the cord was lying on the posterior surfaces of the vertebral bodies. The sac was excised. In the belief that spina bifida is a symptom and not simply a congenital defect, I threaded silkworm sutures from the subdural space into the erector spinae muscles, hoping that thereby the cerebrospinal fluid would drain off into the muscular spaces. The wound was then closed, but remained unhealed for about two weeks, during which time it discharged cerebrospinal fluid copiously. Rapid healing now began, and after three days hydrocephalus developed. As the condition was causing great pain it was decided to drain the lateral ventricle. A curved incision was made over the parietal bone about one inch above the external auditory meatus. A portion of the bone was removed with scissors, and a crucial incision into the dura was made. The brain, thus exposed, was unduly moist. A bundle of short silkworm sutures was thrust into the ventricle, and a large amount of cerebrospinal fluid welled up. The bundle was secured to the cerebral surface of the dura mater, and the skin drawn together with silkworm sutures. The cranial bones at first moved curiously on each other, but twelve hours later the skull had consolidated.

This apparently gave relief from the pain and there was no return of the hydrocephalus during the three weeks following, and the spina bifida wound remained closed. One week after discharge the child died. No particulars were obtainable.

The rapid development of hydrocephalus following the healing of the spina bifida wound is a strong argument in favour of the theory—advanced by Sir John Frazer and others—that spina bifida should not be regarded as a purely local defect, but as the sign, in the cord, of increased pressure of cerebrospinal fluid. The cause of this increased pressure is probably some interference with outflow, possibly by adhesions.

Silhouette Radiograph—Note the large clear sac in Fig. 880 and its shadow in Fig. 881, which is a postero-anterior view. (*Brit Med Jour*, 10th November 1923—A P B.)

Fig. 882.—CERVICAL SPINA BIFIDA

A baby of 3 months

Silhouette Radiograph—A small sac is apparent in the nape of the neck, it was successfully removed. No communication with the dura mater was found.

Result—Recovery

Late Mr A. RICHARDSON.

Fig. 883.—ENCEPHALOCELE

A baby, aged 6 weeks, was admitted for a swelling behind the head.

Silhouette Radiograph—A swelling, with central opacity, projects from the occipital region. The opacity indicates the presence of brain.

Late Mr W. THOMPSON



FIG 880

FIG 881



FIG 882

FIG 883

Fig. 884.—CHROMOPHOBE PITUITARY ADENOMA. (See Fig. 13)

A man, aged 30.

Radiograph.—The ballooning of the sella turcica is highly characteristic of a simple tumour within it. Note the massive mandible.

Treatment.—The tumour was removed by the transfrontal route and its histology verified.

MR NORMAN M DOTT

Fig. 885.—ANTERIOR BASAL MENINGIOMA. (See Fig. 13)

Clinical History.—A woman, aged 44, had subjective ill health and vague personality changes of two years' duration. During the last two months there was severe headache, and for three weeks vision had been deteriorating. She had experienced no sense of smell for several years. Examination revealed complete mental disorientation. Vision was poor on the right side and absent on the left. Bilateral anosmia was present. The left optic fundus was the seat of atrophy and the right, of papilloedema of two dioptries.

Radiograph.—Small flecks of calcification were present $1\frac{1}{2}$ in. above the left wing of the sphenoid on the left side; there was a hyperostosis of the left wing of the sphenoid; 6 cc. of cerebrospinal fluid escaped sluggishly as the result of a left tap, it was replaced by Thorotrast.

Ventriculograph.—The left lateral, third and fourth ventricles are clearly visible. (The ventricular septum was not displaced laterally in an A.P. view.) The backward displacement of the ventricles and complete cutting off of the anterior horn is manifest, the supraoptic and infundibular recesses of the third ventricle are apparent immediately above the posterior clinoid processes, but the upper part of the ventricle shows a more gross displacement.

Operation.—Subtotal removal of the tumour was effected by the left frontal approach.

Subsequent History.—The patient was in much the same state twenty-one months after operation.

MR A R D. PATTISON.

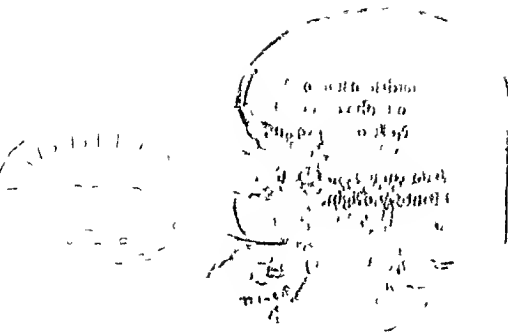


FIG 881



FIG 882

Fig. 886.—CHROMOPHOBE PITUITARY ADENOMA (See Fig 13)

Male, aged 26.

Radiograph—The distension of the sella is here so great that it might be mistaken for a tumour above the sella, the differential diagnosis between the two being lost. Notice the protuberant jaw of acromegaly and beaten brass markings.

Treatment—The tumour was removed by the transfrontal route and proved to be of pituitary origin.

MR NORMAN M DOTT

Fig. 887.—ANTERIOR BASAL MENINGIOMA. (See Fig 13)

Clinical History—A woman, aged 26, had, for eighteen months, been suffering from progressive failure of vision, chiefly in the left eye. For the past three and a half months there had been severe headache. Examination revealed bilateral anosmia; primary optic atrophy on the left side and papilloedema of four dioptries on the right. No obvious personality changes. A plain X-ray of skull revealed nothing.

Ventriculograph.—A left tap was performed and 25 cc. of air replaced the cerebrospinal fluid withdrawn. There is cutting off of the anterior horn and slight backward displacement of the lateral ventricles.

Operation.—Almost complete removal of a massive meningioma occupying the anterior cranial fossæ was performed.

Subsequent History—The patient was alive and well two years later

MR A R D PATTISON

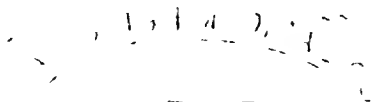




FIG 886



FIG 887

Fig 888.—EOSINOPHIL PITUITARY ADENOMA. (See Fig. 13)

A male, aged 35, who suffered from acromegaly

Radiograph.—Typical ballooning of the sella and acromegalic skull and jaw are apparent.

Treatment.—A large part of the growth was removed by the transphenoid route and the remainder was treated by radiotherapy

MR NORMAN M DOTT.

Fig. 889.—LEFT PARASAGITTAL MENINGIOMA

Clinical History—A male, aged 34, gave a history of eight months' sensory Jacksonian attacks, which began in the fingers of the right hand and from there spread to all parts of the right side. Two months later he commenced to have involuntary twitching of the muscles of the right leg, below the knee, which was associated with progressive weakness of the limb. It was followed by the right arm, which became weak and useless. Examination revealed a right hemiplegia with gross weakness of the lower limb and hyperactive deep reflexes with right extensor plantar response. There was no evidence of increased intracranial pressure. X-rays showed hyperostosis of the inner table in the neighbourhood of the coronal suture associated with increased bony vascularity.

Ventriculograph—A left tap resulted in the sluggish withdrawal of 8 cc fluid, which was replaced by Thorotrast owing to the small amount of fluid withdrawn. In an A P view there was displacement of the ventricles to the right side. In this, the lateral view, there is seen to be flattening of the left lateral ventricle. Details of the third ventricle are well seen.

After-History—Owing to aortic incompetence operation was not considered safe. The patient died two months later and the tumour was confirmed at autopsy.

MR A R D PARTISON



FIG 888



FIG 889

Fig. 890.—CRANIOPHARYNGIOMA. (See Fig 13)

A female, aged 17, with marked infantilism.

Radiograph.—This solid craniopharyngioma is primarily intrasellar, so that the X-ray picture is identical with that of pituitary adenoma. Two small flakes of calcification are visible in the tumour just below and between the anterior clinoid processes.

Treatment.—The growth was removed by the transfrontal operation and its nature ascertained.

MR NORMAN M DOTT

Figs. 891 and 892.—CALCIFIED GLIOMA. (See Figs. 13 and 14)

Male, aged 38.

Radiographs.—Fig. 891 (Right lateral).—Scattered calcification, so characteristic of this type of tumour, is apparent.

Fig. 892 (Postero-anterior).—The same appearance is seen.

Treatment.—A right posterior temporal oligodendroglioma was removed.

MR NORMAN M DOTT



FIG 890



FIG 891



FIG 892

Fig. 893.—MENINGIOMA OF VAULT. (See Fig 13)

Female, aged 41.

Radiograph.—Characteristic erosion of the inner table of the skull is seen immediately above the right lateral sinus. It is associated with increase in diploic vascularity and enlargement of the groove for the posterior branch of the middle meningeal artery.

Treatment.—The tumour was removed and its nature confirmed.

MR NORMAN M DOTT

Figs. 894 and 895.—MENINGIOMA OF VAULT. (See Figs. 13 and 14)

Female, aged 25

Radiographs.—Fig. 894 (Right lateral) —There is marked enlargement of the anterior branch of the middle meningeal artery, the enlarged groove stopping abruptly at the point of the tumour attachment, where the bone appears to be thickened. There is increase in diploic vascularity in the neighbourhood.

Fig. 895 (Postero-anterior).—The tumour is invading the thickened bone. Its histology was confirmed.

MR NORMAN M DOTT



FIG 893



FIG 894



FIG 895

Fig. 896.—MENINGIOMA OF BASE. (See Fig. 13)

Female aged 54

Radiograph—This tumour is exceptional in that it contains many calcified psammoma bodies which cast a definite shadow. An egg-shaped tumour is seen projecting from the inner end of the right sphenoidal ridge, associated with thickening as of the right anterior clinoid process.

Treatment.—A large part was removed at operation and its structure confirmed.

Mr NORMAN M. DOTT

Fig. 897.—MENINGIOMA OF BASE (See Fig. 13)

A female aged 40, with slight proptosis of the left eye.

Radiograph (Antero-posterior).—Marked thickening of the greater and lesser wings of the sphenoid on the left side is seen, due to tumour invasion

Gross thickening of the left anterior clinoid process was apparent in a left lateral radiograph

Treatment—The tumour, together with the involved bone, was completely removed at operation.

Mr NORMAN M. DOTT

Fig. 898.—PINEALOMA

Clinical History.—The man, aged 19, had been in good health until five weeks before admission, since when he had complained of frontal headache morning vomiting and diplopia. Examination revealed high-grade papilloedema of four dioptries, bilateral Argyll-Robertson pupils and rotary nystagmus on upward fixation, otherwise nothing abnormal with the nervous system

A plain X-ray examination of the skull showed general evidence of increased intracranial pressure, viz. convolutional atrophy and slight expansion of the sella turcica. The pineal shadow was not displaced

Ventriculograph—A bilateral tap was done and 20 cc air introduced into the left ventricle and 60 cc into the right. Both ventricles show evidence of hydrocephalus together with dilatation of the third ventricle. A well-marked filling defect is seen in the posterior part of the third ventricle

Operation—The tumour was exposed in the posterior part of the third ventricle through the transeallosal route. It was found to be infiltrating the walls of the ventricle and was regarded as an inoperable ependymoma

After-History—The patient died four months later when the findings were confirmed at autopsy. The histological appearances were those of a pinealoma

Mr A. R. D. PATTISON.

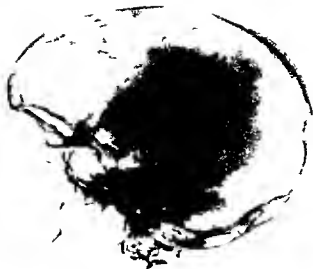


FIG 896



FIG 897



FIG 898

Fig. 901 —ANGIOBLASTOMA. (See Fig. 13)

A female, aged 26.

Radiograph.—Remarkably enlarged diploic channels are seen entering the emissary foramen of the mastoid, indicating the proximity of a vascular tumour attached to bone or dura.

Treatment—The tumour was exposed at operation and radiotherapy instituted. Histologically verified

MR NORMAN M DOTT.

Fig. 902 —OSTEITIS FIBROSA CYSTICA (See Fig. 13)

A female, aged 38, had conspicuous proptosis of the right eye.

Radiograph—The right orbital roof shows a dense, mottled thickening.

Treatment.—The thickened bone was removed at operation and proved microscopically.

MR NORMAN M DOTT



FIG 901



FIG 902



FIG 905

Fig 905 —LOCALISATION OF TREPHININGS PREPARATION OF THE KEY RADIOGRAPH

A scale was prepared consisting of a strip of watch spring, 7 in (17.5 cm) long whose ends were connected by a piece of elastic. At intervals of an inch seven strips of spring 4 in (10 cm) long were fastened at right angles to it, the central one being marked 00 inches. Holes an inch apart, were made in the verticals through which were threaded silver wires.

The head of a dissecting room subject (age 39) having been radiographed, to make certain that there was no great brain shrinkage—which there was not—the cerebrum was removed in the usual way and its membranes stripped off. A photograph was taken to indicate the type of brain being dealt with—fortunately it proved to be particularly well hardened—the cerebral hemispheres weighed 11 oz (1½ kilo). A mixture of red lead and warm vaseline was now painted on the more important sulci and a second photograph obtained. [The width of the paint was more apparent than real the majority having sunk well into the sulci.] The brain covered with tissue paper—to prevent dissemination of the opaque material—was replaced and the scale fitted on the *unshaven* head. It passed from the glabella to the external occipital protuberance lying just above the junction of the pinna and scalp. The circumference of the head in this line which is known as the base line, was 22½ in (56.2 cm). The scale having been adjusted until its central point 00 lay midway between the glabella and external occipital protuberance the upright wires were placed at right angles to it and fixed by means of thread wound round the head. The breadth across the head along each vertical, from base line to base line, was measured. (Only the central five gave a precise reading.)

A pure lateral radiograph was now taken, that this position was obtained is shown by the base line being straight—any deviation causing a curve to appear convex upwards or downwards, as the case might be. The following precautions were taken—

- 1 The tube was 2½ ft (75 cm) from the head
- 2 The rays were centred on the point 00

The curvature of the head renders only the central area available for accurate localisation, it represents an area of about 16 sq in (100 sq cm). This limitation precludes study of the occipital region. The key is of greatest value for the supramarginal angular, superior temporal and pre and post Rolandic convolutions, all of which have been insufficiently charted in man. It will be noted that vertical fissures—e.g. Rolandic sulcus—are shortened, and horizontal ones—e.g. Sylvian—appear nearer the vertex than one sees depicted in text books, these appearances are due to the curvature of the head. Subsequent removal of the brain showed it to have been in excellent position the temporal poles being well buried under the wings of the sphenoid.

(The thinness of the negative in Fig 905 was due to the fact that all attention was focused on making manifest the red lead.)

Figs. 906 and 907.—JACKSONIAN EPILEPSY. (See Fig. 905)

History of Case—Mrs S, aged 39, while riding a bicycle fifteen years before was thrown over the handle-bars and fell on her head, she was stunned, but soon recovered consciousness. Four years later she began to have symptoms of headache, dizziness, etc.

After another year—five years after the accident—slight twitching of the left angle of mouth and left side of tongue occurred occasionally, and continued at more or less irregular intervals for another two years. She had consulted a "Specialist," who suspected a tuberculous tumour of brain.

During the next two years the twitchings of the face and tongue became more severe and more frequent, and tended to be accompanied by clonic contractions of the left arm, but no loss of consciousness, until eventually the fits became continuous, and she passed into a condition of *status epilepticus* with complete unconsciousness.

Operation—Trephining was done over the facial centre and surrounding area on the right side of skull. The dura was opened but nothing definitely abnormal discovered. The wound healed normally and convulsions entirely ceased, but slight weakness of left side of face and left arm persisted for two or three months, and gradually disappeared.

She remained free from fits of any kind for four years, during which time she married and gave birth to a child. Seven months after the birth of the baby slight twitching of face and tongue recommenced, but disappeared under medical treatment.

Two years later the fits recommenced, and gradually increased in severity and frequency until finally they recurred every ten minutes—spasm followed by clonic contractions of angle of mouth, tongue and platysma on the left side. There was no loss of consciousness but the attacks were always preceded by a sensory aura.

Spinal puncture was done, and about 10 cc of clear cerebrospinal fluid was removed. No improvement resulted.

Second operation performed. A flap was raised. The dura was found to be firmly adherent to surface of brain to the edge of bone. A little more bone was removed, enlarging the opening in all directions. The dura was incised and the adhesion to the brain divided until its surface was entirely free. The brain bulged slightly but pulsated. A perforated celluloid plate (as used by the late Percy Sargent) was introduced between the brain and the edges of the opening in the bone, which overlapped it by about $\frac{1}{4}$ in in every direction. The pressure of the brain kept it firmly in place. The patient again made an excellent recovery. There were no fits of any kind for the first forty-eight hours, during the following ten days there were slight attacks at considerable intervals, and there was slight weakness of the left side of face and arm.

After ten days all symptoms ceased and she became apparently perfectly well.

At the present time, rather more than eighteen months after the operation, she has occasional slight twitching of the angle of the mouth and tongue.

Radiograph.—Note the defect with the gyrometer in position.

- 1 Circumference of head in G O line = 21.25 in (53.3 cm).
- 2 Distance of cursor from central point = 8 in (2 cm)
- 3 Height of centre of depression = 2.5 in (6.25 cm)
- 4 Breadth of head in line of vertical = 11 in (27.5 cm)
- 5 Height 2 in (5 cm), Breadth, $21\frac{1}{2}$ in (62.5 cm)

The horizontal factor is $\frac{22.5}{21.25} = 1.06$, which means that for all practical purposes distances can

be transferred direct from patient to key.

The breadth constant at a point 0.8 in (2 cm) behind the central points is $\frac{12}{11} = 1.1$, which makes the height $2.5 \times 1.1 = 2.75$ in (6.7 cm)—i.e. a difference of $\frac{1}{4}$ in (4 mm).

It will be seen that the area affected is the lower part of the pre- and post-Rolandic gyri. From our present knowledge of this centre the lowest part of the area exposed was responsible for the symptoms. It will be necessary to superimpose several areas before it is possible to tell the precise area of cortex that presides over the face.

Dr H. H. BROWN
Mr A. P. BERTWISTILL

I am indebted to Mr Mason of Messrs John Bell & Croyden and Mr W. R. Gray of Messrs Phillips for their help with the gyrometer. Full details are available in *Surgical Radiology*, A. P. Bertwistill, 1929, p. 96.



FIG 906

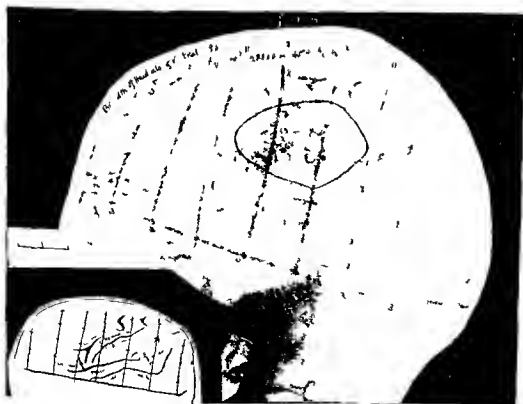


FIG 907

Fig. 908.—ANEURISM: HEART. (See Fig. 771)

Clinical History.—A man of 45 complained of sudden pain in the chest after a hurriedly eaten meal. The pain disappeared, only to return two months later, when it was chiefly epigastric and lumbar. No abnormal physical signs were made out. Wassermann reaction strongly positive.

Screen.—The lateral view showed a well-defined but less deeply hemispherical shadow than A.P. It projected from the posterior part of the heart shadow and did not approach the posterior thoracic wall. Antero-posteriorly the shadow moved to the left with each heartbeat and definitely pulsed with each ventricular systole. It moved freely, with respiration in close conjunction with heart and diaphragm shadows.

Radiograph—A well-defined hemispherical opacity is seen projecting from the left border of the heart shadow, the left edge of which is clearly visible. The heart is enlarged to the right.

Subsequent History.—Under potassium iodide, gr. xxv, t.d.s., the pain disappeared and the patient was able to leave hospital.

Dr W L LINDSAY LOCKE

Dr A P BEDDARD

Dr N MUTCH

Fig. 909.—ANEURISM: AORTA. (See Fig 771)

Clinical History.—A man, aged 47, complained first of a shortness of breath and pain of a gnawing character in the region of the left clavicle for the past seven years. His B.P. was 170/80 on both sides; a loud systolic murmur was present over the aorta and a faint diastolic murmur was heard over the left of the sternum. The Wassermann reaction was strongly positive, two courses of arsenic failed to render it negative. He was admitted to hospital on account of slight hæmoptosis, only to die of lung infection.

Radiograph (P A.)—An enormous bulge is seen above the heart shadow on the left side. It exhibits a crescentic area of slighter radiopacity along its free edge which is difficult to explain. The heart is enlarged to the right.

F TOLLEY

Dr HOLMES WATKINS

Fig. 910.—MITRAL STENOSIS. (See Fig 771)

Clinical History.—This woman, aged 28, had a baby eighteen months previously, she was again pregnant, and her doctor considered that her heart would not stand the strain. There was a vague history of rheumatism. She was cyanosed and breathless; the heart was much enlarged.

Radiograph—The heart is almost symmetrical in the chest, so great is the enlargement of the right side.

After-History—An abortion was induced.

Late F H FRIER

Dr E HOLMES WATKINS



FIG 908

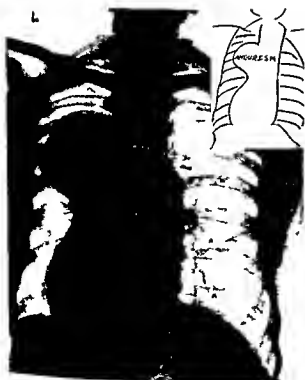


FIG 909



FIG 910

Fig. 911.—PERICARDIAL EFFUSION. (See Fig. 767)

Clinical History.—This boy, aged 10, had for some weeks been suffering from rheumatic fever. His heart was examined daily: then, one day, it appeared to have gone to pieces. He lingered for some weeks, in great pain and misery, and then died.

Radiograph.—So great is the effusion that the heart appears to be almost symmetrical. Close inspection shows that, whilst there is some enlargement of the heart to the right of the sternum, beyond this is fluid, which is less dense than the myocardium. On the left of the sternum the effusion is seen tracking up from the fifth rib to the sternoclavicular joint.

DR GROOV

MR E A BULLMORE.

Fig. 912.—ANEURISM: AORTA. (See Fig. 771)

Clinical History.—A man, aged 59, experienced pain of a dull character, worse at night, in the left shoulder, radiating up into the neck and down into the arm. Examination revealed a systolic murmur, blood pressure 240/120 and a strongly positive Wassermann reaction.

Radiograph—Extending from a point just above the left clavicle to the third rib is a rounded shadow continuous with that of the aorta, due to an aneurism. The heart shadow is enlarged to the right.

Nottingham General Hospital.

Fig. 913.—THORACIC ANEURISM (See Fig. 771)

Radiograph (P.A.)—The cardiac shadow is greatly increased, due to an extensive aneurism of all parts of the thoracic aorta

DR L A. ROWDEN

Fig. 914.—ANEURISM. (See Fig. 771)

Clinical History.—Five years before a man, aged 54, had dyspnoea on exertion, and a year later had an area dull to percussion over the first to third costal cartilages on the right side. Screen examination showed slight broadening of the aortic shadow. The Wassermann reaction was strongly positive. At the time of examination dyspnoea was marked and the area of dullness was more conspicuous

Screen.—An oblique view showed the aorta and branches to be dilated.

Radiograph—The whole of the thoracic aorta is dilated. On the left of the descending aorta, especially above, are shadows due to calcification of blood clot formed where the blood flow is sluggish; in time true bone is formed.

Treatment.—A course of intravenous N.A.B. resulted at the outset in some reaction; once some blood-stained sputum was coughed up. Two months later all symptoms had disappeared.

DR N Mutch.



FIG 911



FIG 912



FIG 913



FIG 914

Fig 915.—CALCIFICATION OF ARTERIES

The anterior and posterior tibial, peroneal arteries and their larger branches are clearly identified. Note the ringed appearance and tortuosity.

N.B.—The tibia has suffered an oblique fracture.

Dr G F STEBBING

Late Sir CHARTERS SYMONDS.

Fig. 916.—CALCIFICATION OF ARTERIES

Silhouette Radiograph.—The posterior tibial, peroneal and plantar arteries are calcareous. There has been a severe fracture of the calcaneus.

Dr L A. ROWDEN.

Fig 917.—RUPTURE OF SCLEROSED ARTERY

Clinical History.—A man aged 48 received a heavy blow on the back of the right leg from some falling timber. When examined there was extensive bruising of the whole calf. This was treated in the ordinary way and was later massaged. The massage rapidly reduced the discoloration and swelling, with the exception of an area near the middle of the leg and just behind the internal margin of the tibia. A swelling the size and shape of an egg persisted in this area: it was much paler than the surrounding parts and was fluctuant, but did not pulsate; it was diagnosed as a deep hæmatoma. On the eighth day it was aspirated and bright red blood was removed. Firm pressure was then applied, but the swelling re-formed. Some days later it was again aspirated. A small notch could then be felt in the margin of the tibia. Pressure was again applied, but the swelling once more returned, on this occasion to a lesser degree. The leg was X-rayed on the sixteenth day, with the result shown.

Radiograph.—There is an irregularity in the line of the posterior surface of the tibia, corresponding to the notch. The posterior tibial artery is in a fairly advanced condition of arteriosclerosis; at the level of the notch the artery has been driven against the bone and has broken. The fracture of the artery is shown faintly but distinctly. The swelling ultimately subsided and there was no apparent interference with the circulation in the foot.



FIG 915



FIG 916



FIG 917

Fig. 918.—NÆVUS OF CHEST

Silhouette —A large mass is apparent, filling up the right axilla and extending as far as the ninth rib. The mass showed dilated veins, it was markedly expansile with respiration, coughing and struggling. Areas of resonance were present. The signs somewhat resembled those of a hernia of the lung, but the presence of normal ribs excluded that diagnosis.

Radiograph —The tumour has somewhat separated the humerus from the glenoid cavity. Its opacity is due to blood

MR COLLINSON

Fig. 919.—GOUT. (See Fig 23)

In the vicinity of the metatarso-phalangeal joint of the great toe is a large mass of calcified tissue and some new bone formation. Masses of tophi are seen about the base of the fifth metatarsal; some are eroding the shaft of the fourth metatarsal and others setting up periostitis of the fifth

N.B.—Whilst gout is largely a disease of the past it occurs at times and closely simulates suppuration, so much so, that unless it is borne in mind needless incisions may be inflicted. Whatever the site, there is usually some pain and stiffness in the great toe.

Dr R W A SALMOND

Fig. 920.—MONCKEBERG'S SCLEROSIS

A man aged 47

Radiograph.—There are fractures of the second and third metatarsals and of the external sesamoid of the great toe. Arthritic changes are present in the hallux metatarsal joint.

The branches of the plantar arch are clearly seen, more especially on the inner side of the foot, owing to their calcification or even ossification. The condition occurs in comparatively young subjects.

Nottingham General Hospital

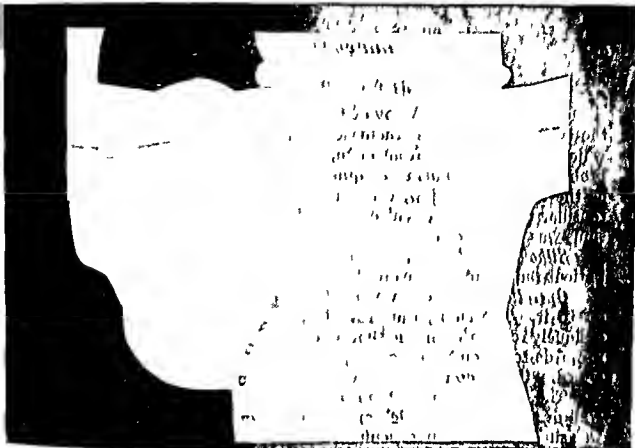


FIG 918



FIG 919



FIG 920

Fig. 921.—BRANCHIAL SINUS

Clinical History.—A boy of 17. There was a depressed sinus between the two heads of the sternomastoid, about one inch above the clavicle, which had discharged from birth, and more so when he had coryza. A probe showed the sinus to be quite superficial to the sternomastoid as far as the angle of the jaw, where it passed deeply inwards. Large supra-mastoid fossæ were present on each side, but no communication with the sinus was demonstrated.

Silhouette Radiograph.—A probe has been passed into the sinus, and the patient radiographed. Note the external opening, and upper termination.

Operation —A probe was passed into the sinus and an incision made on to it. The sinus, thus revealed, was like a stout vein. It passed obliquely round the anterior border of the sternomastoid, and was dissected upwards to a point $\frac{3}{4}$ in. above the angle of the jaw, where it apparently ended. It had no relation with the carotid arteries.

The sinus measured $3\frac{7}{8}$ in. long, and $\frac{1}{4}$ in. in diameter. Above, the wall of the sinus was thick and studded with lymphoid nodules. There was suggestion of a diverticulum.

Microscopically, the lining consisted in its upper part of columnar epithelium with much lymphoid material, below, squamous epithelium formed the lining.

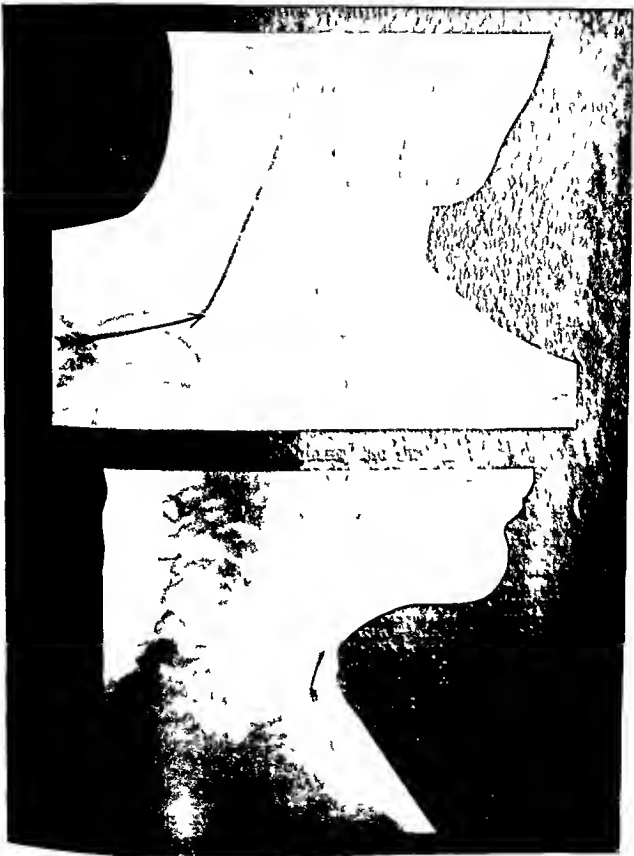
After-History.—The whole broke down, a not uncommon finding with many congenital conditions.

Fig. 922.—THYROGLOSSAL SINUS

Clinical History.—Occurred in a boy aged 7. The sinus was first noticed when he was eighteen months old, and has since remained stationary. At times a swelling appeared, and then he had pain during mastication, otherwise there was no inconvenience except a thin discharge, occasionally replaced by a sticky yellow fluid. A sinus was present in the midline of the neck, surrounded by cicatrices. It moved on deglutition, and was palpable as a firm cord attached to the hyoid bone.

Silhouette Radiograph —“Bip” has been introduced into the sinus by means of a large-bore syringe. The opaque material is seen passing up towards the hyoid bone. Another attempt at filling the sinus succeeded in locating it just below, and in front of, the hyoid bone.

Operation —The sinus was found to end in a fibrous cord, which passed into the median raphe above and in front of the hyoid bone.



FIGS 921 and 922

Fig. 923.—BRANCHIAL SINUS

Silhouette Radiograph—Bismuth paste has been injected into the sinus Same case as Fig 921

Fig. 924.—THYROGLOSSAL SINUS

Clinical History—A woman, aged 28, was admitted with a small translucent nodule in the neck, exuding a thin serous fluid She states this secretion was increased during mastication According to her account it had existed about six years, during which time it had occasionally ceased discharging, and then a swelling appeared This burst and the immediate discharge was a thick, yellow fluid On puncturing for injection purposes honey-like fluid escaped

Silhouette Radiograph—Note pear-shaped bead of bismuth

Operation—A transverse incision was made, and the sinus, which ended above in a fibrous cord, was dissected out from the deep tissues between the hyoid bone and thyroid cartilage, and the wound closed Healing was delayed, but six months later there had been no return, but a slight keloid was present

Microscopic Examination—An open tract runs along the length of this specimen, lined by very vascular and thick granulation tissue No epithelial lining cells are to be seen anywhere A fairly thick mass of thyroid tissue, with well-developed vesicles, extends along the whole length of the tract, but along only one side of it (? which side) Every stage of formation of the vesicles is to be found in the sections of this aspect of the tract

Fig. 925.—THYROGLOSSAL CYST

Clinical History—A woman, aged 29 The swelling of the neck which had existed for some time had lately increased in size, and become tender, interfering somewhat with mastication

Silhouette Radiograph—Note prominence in neck due to cyst

Operation—A transverse incision was made along the line of the natural crease in the neck The cyst was freed as much as possible, not, however, without the contents escaping The fluid in the cyst resembled pus, some was collected for chemical examination, and found to contain iodine The whole of the cyst wall was carefully removed, and the wound closed by intradermal suture There was no return of the cyst after four months

Microscopic Examination—One slide A section showing thick granulation tissue round what may have been a sinus or cavity, outside this are bands and bundles of fibrous tissue, with material of embryonic type between the bundles A tendency to formation of thyroid structures is found here, with some groups of definite and fair-sized vesicles

Fig. 926 —THYROGLOSSAL CYST

Clinical History—A boy, aged 2 A small superficial cyst was present between the thyroid cartilage and hyoid bone It was noticed three months previously

Operation—A transverse incision was made and the cyst removed It was adherent above to the thyroid cartilage There was no return in three months, and no keloid had developed

Figures 922, 924–926 from “Facts and Considerations in the Study of the Thyroglossal Tract,” by J L Frazer and A P Bertwistle —*Brit Jour Surg*, vol XII, No 47, 1925



FIG 923

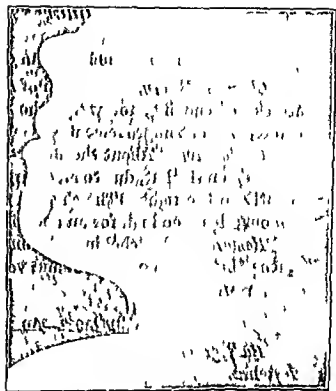


FIG 924

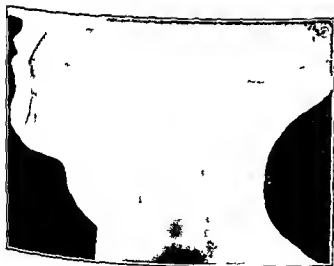


FIG 925



FIG 926

Fig. 927.—SUBSTERNAL GOITRE. (See Fig. 771)

Clinical History.—A woman of 58 suffered from spasmodic cough and attacks of choking, for which the uvula had been removed four years before, without improvement.

Radiograph.—About the sterno-clavicular joints is a rounded shadow, best seen on the left, due to an enlarged thyroid. The trachea is displaced slightly to the right. The shadow might have been caused by a thymic tumour; it is too high for an aneurism.

Remarks.—The choking was undoubtedly due to compression of the trachea between the sternum and vertebral column by the goitre.

Mr O A MARLER

Sir EDMUND SPRIGGS

Fig. 928.—ADENOMA THYROID

Radiograph.—An oval shadow is seen opposite the fifth cervical vertebra.

Remarks.—Calcification is prone to occur in adenomas after hæmorrhage.

Dr L. A. ROWDEN

Fig. 929.—HAND OF CRETIN. (See Fig. 40)

Child aged 5.

Radiograph.—Note the shortened, infantile hand. No ossific nuclei are seen in the epiphyses of the metacarpus, phalanges, or ulna. Of the carpus only the os magnum and unciniform show any ossification.

Reprinted from "Cretinism," R. Lawford Knaggs. *British Journal of Surgery*, vol. xvi. No. 63. 1929, p. 383

Mr C G WORLON

Dr R A VLAM

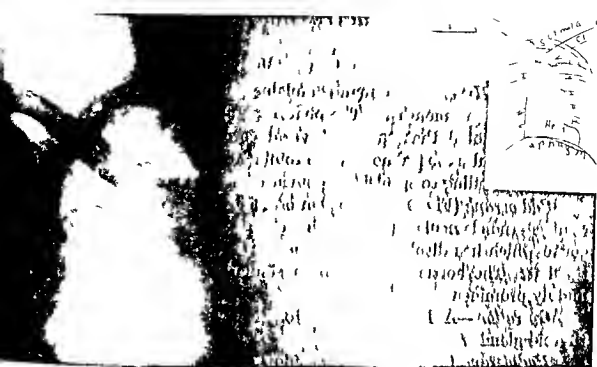


FIG 927



FIG 928



FIG 929

Figs 930 and 931.—RETRO-STERNAL GOITRE. (See Fig. 771)

Clinical History.—The man complained of loss of voice and harshness of tone for many months. The pharynx and nasopharynx were normal, but it was noted that the right vocal cord was immobile. The right subclavian pulse was abnormally prominent and over it a harsh sound was heard, leading to suspicions of aneurism.

Radiograph (Fig. 930).—No sign of aneurism is present, but about the right sterno-clavicular joint is the circular shadow of a retro-sternal goitre which has displaced the trachea—seen as a radiolucent streak—to the left. The aortic arch has been similarly displaced, thus becoming unduly prominent.

Operation.—A large adenoma together with the right half of the thyroid gland was removed.

Radiograph (Fig. 931).—The shadow about the sterno-clavicular joint has disappeared.

Result.—The patient was well one year after operation

Mr C E S JACKSON

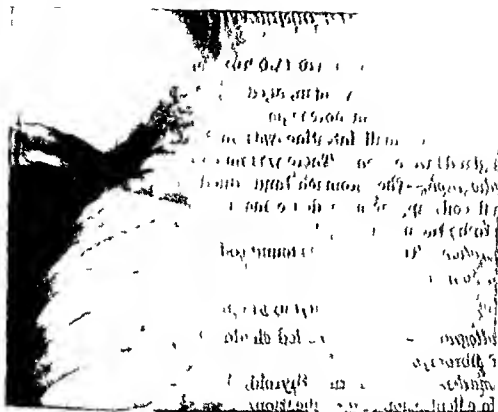


FIG 930

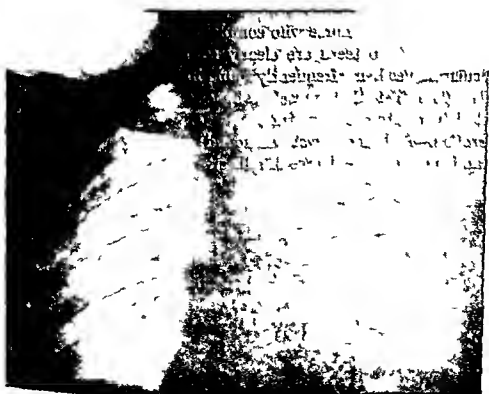


FIG 931

Fig. 936.—FETAL DEATH

Clinical History—Ten years previously this woman was delivered of a seven-month, still-born fetus. No further conception occurred until this occasion. She was attending the V D Clinic, but the Wassermann reaction was negative.

Radiograph—Note the way the parietal bone overlaps the occipital and frontal bones, a sign of fetal death (Spalding). It is not to be confused with normal moulding which only occurs when the head is engaged in the pelvis.

After-History—A 36-hour labour resulted in a still-born fetus.

Late F H FRICK

Fig. 937.—EARLY PREGNANCY

Clinical History—According to the menstrual history this would be a 12-week pregnancy, but the size of the uterus indicated an 18-week gestation.

Radiograph—Almost the whole of the fetus is visible in the true pelvis.

Late F H FRICK

Mr J O HARRISON.

PELVIMETRY**Fig. 938.—NORMAL PELVIS**

An eighth-month pregnancy. The fetal skull lies almost centrally in the pelvis, with an even distance between it and the pelvic brim.

The pubic measurement was 5 $\frac{1}{2}$ in. The pelvic figures were as follows: true conjugate 5 $\frac{1}{2}$ in, being $\frac{1}{2}$ in above normal, the lateral 5 $\frac{1}{2}$ in (normal), right oblique 5 in ($\frac{1}{2}$ in above normal), left oblique 5 in. (normal). The biparietal of the fetal head was 3 $\frac{1}{2}$ in, suggesting a male, which was confirmed. It lies in the occipito anterior position.

Dr L A ROWDEN

Fig. 939.—SMALL PELVIS

A woman of 38, height 5 ft 1 in. She was eight months pregnant, the spine indicates an occipito-posterior lie. The fetal skull lies anterior to the central point of the pelvis, which is heart-shaped, with the narrow part anteriorly.

The pubic measurement was 5 $\frac{1}{2}$ in. The pelvic measurements were: the true conjugate 4 $\frac{1}{2}$ in; the lateral 4 $\frac{1}{2}$ in, the right oblique 4 $\frac{1}{2}$ in and the left 4 $\frac{1}{2}$ in. The biparietal of the fetal skull was 3 $\frac{1}{2}$ in.

Dr L A ROWDEN

Fig. 940.—FLATTENED OR PLATYPELOID PELVIS

A woman of 34, height 5 ft 5 in, during the twenty-seventh week of pregnancy. True conjugate 3 $\frac{1}{2}$ in, lateral 5 $\frac{1}{2}$ in, right and left oblique 4 $\frac{1}{2}$ in; external conjugate 7 $\frac{1}{2}$ in.

Dr L A ROWDEN.

Fig. 941.—ANTHROPOID PELVIS

A woman during the eighth month of pregnancy. The pelvis is egg-shaped, the narrow part being anterior.

The pubic measurement was 5 $\frac{1}{2}$ in, the true conjugate 5 $\frac{1}{2}$ in, lateral 4 $\frac{1}{2}$ in, right oblique 4 $\frac{1}{2}$ in; left oblique 4 $\frac{1}{2}$ in. The biparietal of the fetal skull was 3 $\frac{1}{2}$ in, suggesting a female, this was confirmed.

Dr L A ROWDEN



Fig. 942.—POSITION FOR PELVIMETRY.

Fig 940

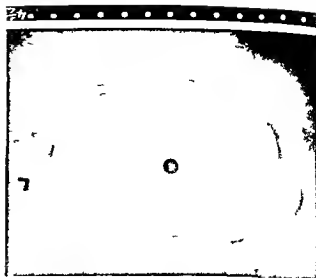


Fig 941



Fig 938

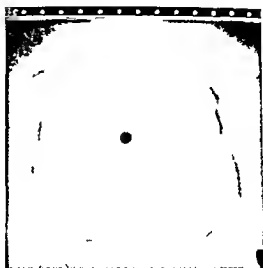


Fig 939



Fig 936



Fig 937





FIG 936



FIG 937

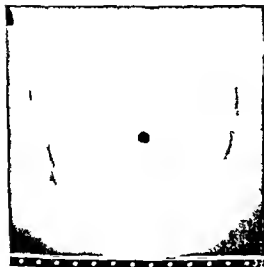


FIG 938



FIG 939

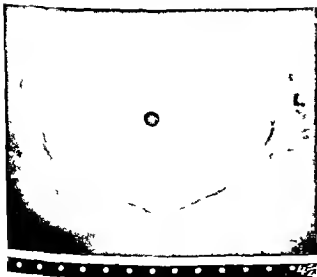


FIG 940



FIG 941

Fig. 943.—BREECH PRESENTATION

Radiograph.—The head lies high up in the abdomen whilst the breech occupies the true pelvis. It will be noted that the legs are extended and that the lower femoral epiphysis is commencing to ossify, proving that the foetus is full term.

Dr L. A. ROWDEN

Fig. 944.—HYDROCEPHALUS IN UTERO

Radiograph—Note the huge, scantily calcified head, which even now, at the seventh month of gestation, is incapable of entering the true pelvis.

Dr L. A. ROWDEN

Fig. 945.—TWINS

Radiograph.—One head is seen in the upper abdomen; the other, with its breech in the pelvis, lies lower down.

Dr L. A. ROWDEN

Fig. 946.—QUADRUPLETS

Radiograph—Four heads and spines are visible. The heads occupy the following positions. one on the ala of the right ilium, one over D. 12 and L. 1, another between the left ilium and the costal region, and a fourth, less clearly defined, over L. 3 and 4. The associated spines can be recognised.

SOURCE UNKNOWN



FIG 913

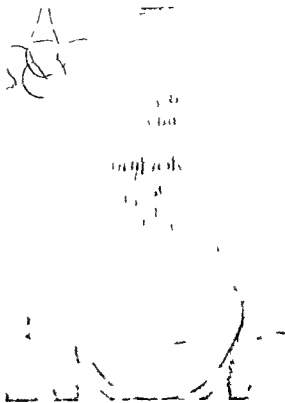


FIG 914



FIG 915

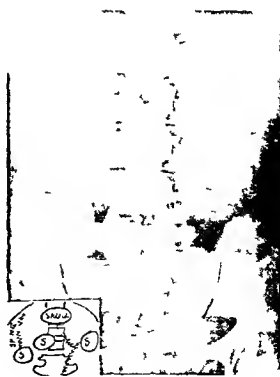


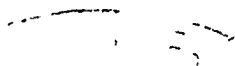
FIG 916

Fig. 947.—ANENCEPHALUS IN UTERO

Radiograph.—A mushroomed growth takes the place of the cranium. The upper limbs are grossly deformed, the lower limbs are represented by two misshapen femora. Hydramnios is common with such monsters.

Is abortion justified?

Dr L. A. ROWDEN.



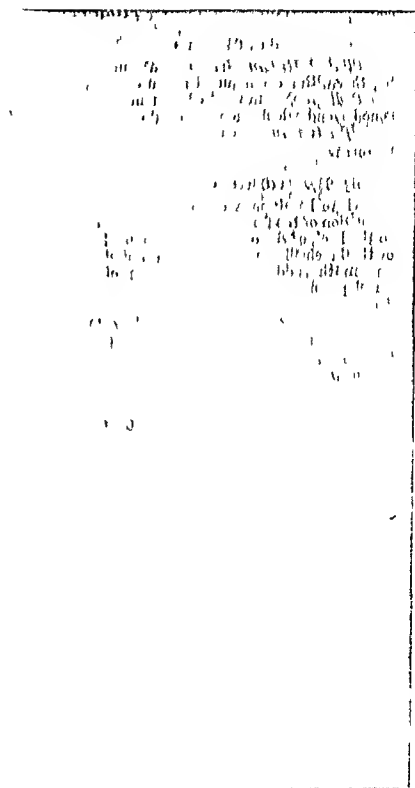


FIG 917

Fig. 948.—MYOSITIS OSSIFICANS. (See Fig 51)

Clinical History—The patient suffered a posterior dislocation of the elbow together with a comminuted fracture. Reduction was effected.

Radiograph—In front of the joint is a worm-like mass of new bone, that it has gone beyond calcification is proved by the “graining” present.

After-History—Extension of the head of the radius was followed by complete cure.

F TOLLEY

Mr HARRISON

Fig. 949.—MYOSITIS OSSIFICANS IN BRACHIALIS ANTICUS. (See Fig. 51)

There has been a fracture-separation of the lower epiphysis of the humerus. Reduction of the fragments has not been accomplished, and the epiphysis has united to the back of the diaphysis, leaving a sharp lower end projecting among the fibres of the brachialis anticus, in which muscle myositis ossificans has developed. Here and in the adductor magnus are probably found the commonest sites for its development.

Fig. 950.—MYOSITIS OSSIFICANS IN RECTUS ABDOMINIS

This plaque of bone was removed at operation from the rectus abdominis. There had been a previous operation through the rectus in the subcostal angle, the scar of which was causing pain and discomfort.

Late Mr RICHARDSON.

Fig. 951.—OSSIFICATION OF INTEROSSEOUS SEPTUM

Clinical History.—This officer struck the front part of his leg against the side of a swimming bath. It became very painful, only relieved by rest.

Radiograph (Lateral)—Some three inches below the knee is a scroll-like mass of light bone about three inches long, lying between the tibia and fibula, not connected to either bone.

Radiograph (A P)—The new bone is well seen.

N B—This probably started as a hæmorrhage which calcified, the calcareum deposit was invaded by blood vessels, with the result that bone—evidenced by “graining”—formed.

Late F H FRIER

Mr J O HARRISON.

Fig. 952 —MYOSITIS OSSIFICANS OF VASTUS INTERNUS

This developed in the vastus internus as the result of a blow. It is analogous to the “rider’s bone,” which is the expression of multiple traumata. The pain it caused necessitated removal, which was successfully done. Observe that the bone is laid down in the direction of the muscle fibres.

Late Mr RICHARDSON.

Fig 953.—MYOSITIS OSSIFICANS

Clinical History.—As the result of slipping off the kerb in snowy weather this man, aged 65 developed a swollen knee, which was very painful. As it did not subside after fourteen days he was X-rayed, with the following result.

Radiograph—The inner side of the knee joint is swollen. Close to the internal femoral condyle is an elongated mass of calcareous material which has not as yet acquired the graining of bone.

Result—Strapping of the knee caused complete recovery.

Late J H PILER

Mr A P BERTWISLE.



FIG 948

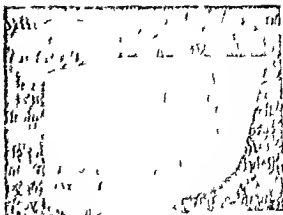


FIG 949



FIG 950

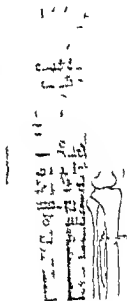
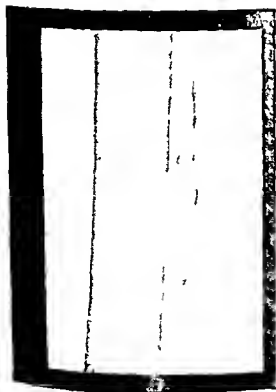


FIG 952

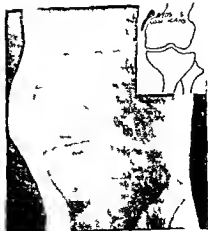


FIG 953

* Fig. 954.—**CLEIDO-CRANIAL DYSOSTOSIS.** (See Fig 15)

Clinically—A man aged 35, alleged that he had an accident cranking up his car. Examination revealed a deformity about the acromio-clavicular joint which was bilateral. Believing that he had injured a congenitally weak part, it was strapped, and a certificate accordingly was given.

Radiograph—The inner half of the clavicle ends beyond its middle in a point, below which is a short flake of bone sole representative of the outer half.

A year later he was taken into custody for having drawn £2300 from different insurance companies during the course of seven years for what were thought to be fractures of the clavicle aptly described in the newspapers as a "lucrative collar-bone." Deformities of the clavicle are very rare, no doubt due to the early fusion of its two centres of ossification. It is often associated with imperfect ossification of the cranial bones (Keith, *Human Embryology and Morphology*, 1913 p 431).

This case raises the difficult problem of whether a congenital deformity is a weak point and the extent of the insurance companies' liabilities. The finding of a congenital deformity after an accident does not prove absence of injury. The key to these abnormalities lies in the fact that they are almost invariably bilateral, hence the need of radiographs of the opposite side in legal proceedings on cases of this kind.

MR A. P. BERTWISTLE

Fig. 955.—**MYOSITIS OSSIFICANS.** (See Fig 15)

Clinical History—The man aged 36, an agricultural labourer was knocked off his bicycle and sustained a fracture of the humerus below the surgical neck the upper fragment projecting under the skin, also a compound fracture of the ulna. Treatment by steel-bar frame to obtain gradual extension of humerus by the weight of the arm was applied.

X-ray examination three weeks later showed extensive comminution some fragments lying free. Six weeks later there was non-union of the humerus, a radiograph revealed a faint hazy shadow between the comminuted fragments. Three weeks later passive movements and massage were instituted and the arm fixed to the side splints being discarded. Two and a half months after the accident there were undoubted evidences of myositis ossificans fibrous union was present with only slight range of movement.

His insurance company was anxious for a settlement, which was effected, the patient being considered permanently unfit for work owing to non-union.

Ten months after the accident there was firm bony union with $\frac{3}{4}$ in of shortening. A narrow bony spike possibly attached to the humerus has united with the other spicules. Patient is doing light work.

Sixteen months after the accident the patient was doing full labouring work, he admitted no disability. There was weakness of deltoid movements otherwise shoulder-joint movements were good. A narrow hard mass was palpable in the pectoralis major, which could be grasped and rolled between the fingers; it did not interfere with joint movements.

Radiograph—The humerus has been fractured near the surgical neck, the head and shaft next to the head are somewhat rarefied alignment is good. Below the neck is a spur of bone, the point of which appears between two long fragments of new bone lying horizontally, the internal one of which is thick externally, fading away towards the chest.

MR W. B. R. MONTEITH

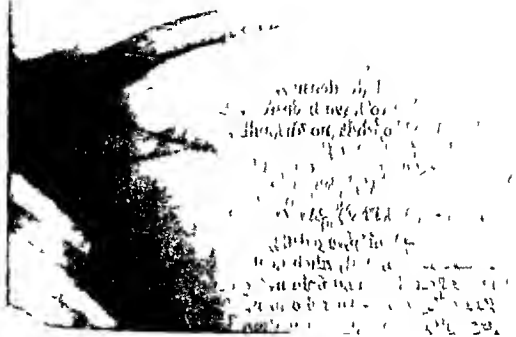


FIG 954



Fig 956.—CONGENITAL SYPHILIS. (See Fig 51)

Clinical History.—A boy had an injury of the elbow two months previously for which compensation was claimed.

Radiograph.—Note the expansion of the upper end of the ulna due to a deposit of new bone of slight density. The joint surfaces have escaped, so that movement ought to have been free. The appearance has none of the features of callus, so that no disability could be attributed to his injury

Dr J H MATHER

Late Mr W McADAM ECCLES

Fig. 957.—GLASS IN PREPATELLAR BURSA. (See Fig. 22)

Clinical History—A man, aged 38, fell on some glass and sustained a cut, which was stitched, and which healed promptly. For six weeks he had complained of creaking and pain in front of the knee.

Silhouette Radiograph.—This shows swelling in front of and below the patella and a small flake of glass near the joint.

N.B.—Though this case did not come to litigation it might have been possible to claim damages for a retained foreign body, though it is doubtful whether in this case it caused any of his symptoms.

Mr E J BARBER

Mr A P BERTWISTLE

Fig. 958.—INJURY IN OSTEOARTHRITIC KNEE. (See Fig. 22)

Radiograph—Compare the generalised loss of opacity of the bone in the vicinity of the knee compared with that at some distance away. An osteophyte is seen at the top of the patella, but such was present on the opposite side, where one was found in front of the spine of the tibia and another near the uppermost part of the condylar surface of the femur

The determination of injury in such limbs is very difficult, the fracture of an osteophyte may be the cause of grave disturbance in function

Dr RUSSELL J REYNOLDS

Late Mr W McADAM ECCLES

Fig. 959.—OS ACETABULI. (See Fig 20)

Radiograph—At the uppermost part of the acetabulum is a small piece of bone, readily mistaken for a fracture.

Dr RUSSELL J REYNOLDS

Late Mr W McADAM ECCLES

Figs 956, 958 and 959 all came to the Courts



FIG 956

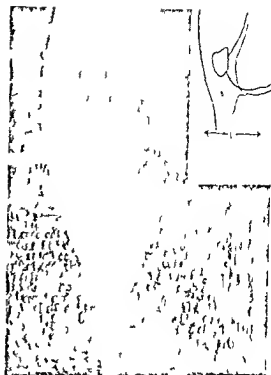


FIG 957

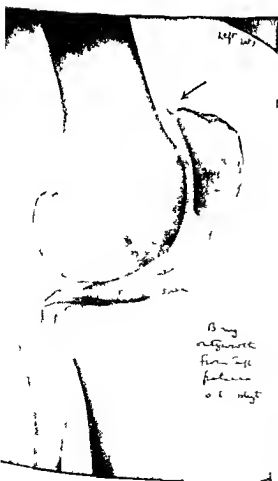


FIG 958

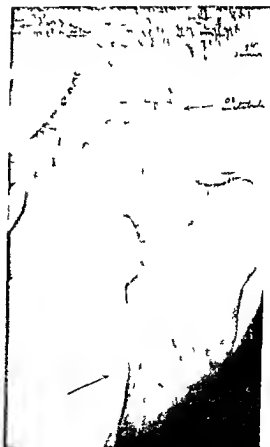


FIG 959

Fig. 967.—FŒTUS—CROWN-RUMP, 112 mm.

Though this is considerably longer than the previous specimen, ossification of the vertebral centra is less advanced. Note that all bones are straight, possessing none of the curves found in the adult.

Mr E J BARBER

Mr A P BERTWISTLE

Fig. 968.—FŒTUS—CROWN-RUMP, 140 mm.

Ossification is well advanced in the frontal and occipital bones, that in the parietal bone is also well seen. The phalanges are well developed. Bony changes are apparent in the alæ of the sacrum, though it was apparent in the centra much earlier, showing that in this bone the plan of ossification is reversed.

The ischium has begun to ossify, thus dating the specimen as 3 months old.

Mr E J BARBER

Mr A P BERTWISTLE.

Fig. 969.—FŒTUS—CROWN-RUMP, 146 mm.

Mandibular ossification is proceeding well. The acromion process is becoming bony.

The ischium has started to ossify. Joint spaces are reduced.

Mr E J BARBER

Mr A P BERTWISTLE

Fig. 970.—ANENCEPHALUS. (See Fig. 33)

A still-born macerated fœtus of nine months' gestation.

Radiograph—Apart from the head and neck this fœtus is normal, and is mature, as can be seen by the centre of ossification in the lower femoral epiphysis. The cervical vertebræ would appear to have fused into one block. The mandible is either represented by two masses of bone which have failed to fuse or by a bony arch above these.

Dr L A ROWDEN

DETERMINATION OF FŒTAL AGE

This presents one of the most baffling problems of Medicine. Apart from its anatomical interest it has great importance medico-legally in cases of abortion and suicide in pregnant women. The following facts can be ascertained without the necessity of a post-mortem—

1 *Viability*—Whether the fœtus had a separate existence—i.e. breathed—can be shown by the radiolucency of lungs and stomach, since the first act of inspiration results in these becoming full of air. Fig. 29 was obviously a still-born child.

2 *Maturity*—The centre of ossification for the lower femoral epiphysis appears at the end of the ninth month of gestation.

The following are the commonly accepted methods of determining fœtal age—

1 *Menstrual History*—When available, which is often not the case in criminal cases, this probably gives the most accurate data, but there are certain pitfalls.

(a) Certain women, especially if an abortion is threatened, haemorrhage on one or more occasions at the time when the period should have fallen due.

(b) Even provided that menstruation ceases after fertilisation there is no knowing whether the fœtus is a day or a month old, according to whether conception occurred immediately after the last period or immediately preceding the missed one, though evidence points to it being at least a week old.

(c) The fœtus may have died days before extrusion.

2 *Crown-Rump Measurement of His*—This is the commonly accepted rule in describing fœtuses, but just as the new-born babe varies in length so does the fœtus.

3 *Crown-Heel Measurement*—This is even less dependable than His's method. The younger the specimen the greater is the liability to error. This is largely due to the disproportion of lower limbs.

4 *Clarified Specimens*—The essential of this process is the dehydrating and rendering of all tissues, save bone, transparent by the use of solutions of potassium hydrate in strengths varying from 1 per cent to 5 per cent. This method, introduced by Schultze, was employed with great success by Mall. Spalteholz's splendid examples are well known. Mr Bourne prepared a magnificent series for the Royal College of Surgeons' Museum, London. The only objection to this otherwise perfect method is the time factor—months of careful watching are required for good specimens and often they fall to pieces.

5 *Serial Sections*—These consist of serial sections and reconstructions on an enlarged scale. The process gives models in three dimensions, which can be dissected, thus avoiding the overlapping of shadows which occurs in radiograms. It is undoubtedly good, but its costliness and tediousness render it unsuitable for the determination of age of a large series of fœtuses.

6 *Radiographic Method*—Despite the truth of H. A. Harris's dictum that "the times of appearance of centres of ossification and the union of diaphyses and epiphyses are as variable as are the teeth in their eruption," the author feels that once a full series of fœtal radiograms have been prepared they will give a more accurate and more easily applied method for determining fœtal age than any other.

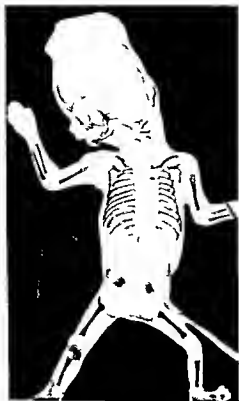


FIG 967



FIG 968



FIG 969



FIG 970

ANTHROPOLOGY ¹

Fig. 971.—PELVIS OF CHEDDAR CAVE MAN

This is one of many lumps of rock containing human remains which have been found near the entrance of the Cheddar Cave. The skull has been described by Sir Arthur Keith as being at least 20,000 years of age. Projecting from an irregular earthy mass were the acetabulum, symphysis pubis and ischial tuberosity.

Radiograph —The amount of bone visible is in excess of that seen with the naked eye, but the calcareous nature of the "earth" prevents good definition. The acetabulum and tuber ischi are seen.

Mr E. J. BARBER

Mr A. P. BERTWISTLE.

Fig. 972.—PLESIOSAURUS BONES IN SLATE

A collection of prehistoric bones embedded in slate of a specific gravity of 3.4. These bones are anything from one to two million years old.

Radiograph.—The bones are perfectly distinct, but there is no trace of internal structure apparent, owing to fossilisation. The articular processes are separated from the bodies of the vertebræ.

Mr E. J. BARBER

Mr A. P. BERTWISTLE.

¹ Reprinted from *British Journal of Radiology*, 1932, p. 589



FIG 971



FIG 972

HELMINTHOLOGY

Figs. 973 and 974.—**CYSTICERCI**

Clinical History.—The man, aged 35, served in India, where he harboured a tapeworm; he did not know why he was pensioned off. During the last six or seven years he has had six epileptic fits; examination of the nervous system was negative.

Radiograph.—Fig. 973.—Scattered throughout the thighs and pelvis are opacities, some elongated, others rounded, caused by calcified cysticerci.

Fig. 974.—Dotted throughout the chest are similar opacities. They should not be mistaken for tuberculous foci because of their universal distribution and equality.

Late F. H. FRIER.

Dr E. HOLMES WATKINS.

Figs. 975 and 976.—**HYDATIDS OF LUNG.** (See Fig. 767)

Clinical History.—A girl, aged 9, who was very healthy, and not fond of animals, and who had never been abroad, began to spit blood, and had had dark sputum since. In March 1930 she had a smart hæmoptysis, though feeling quite well. An eosinophilia of 11 per cent. and a positive complement-fixation test of echinococcus were found.

Screen.—Good movement present in the right side of the diaphragm, but little in the left.

Radiograph.—Fig. 975 (Erect).—Two spherical masses are seen in the left chest: one, the larger, is uniformly opaque; the other contains air, and was no doubt the cause of her sputum and hæmoptysis.

Treatment.—After rib resection Mr. Morriston Davies removed the lower cyst membrane, which proved to be hydatid in nature. All symptoms disappeared. Five weeks later the upper cyst was removed.

Radiograph.—Fig. 976.—No trace of cyst is seen, there is some falling in of the lower chest wall.

After-History.—She is without symptoms and is gaining weight.

Cheshire Joint Sanatorium

Dr PETER W. EDWARDS



FIG 973



FIG 974

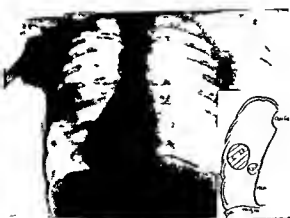


FIG 975

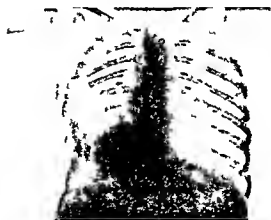


FIG 976

Fig. 977.—ASBESTOSIS. (See Fig. 770)

Clinical History —A male had been exposed to dust for 37 years in his occupation as a clerical worker in an asbestos factory.

Radiograph (P.A.) —Shows the typical ground-glass appearance of the lung fields and the woolly outline of the heart shadow, both typical of the condition. (Modern methods of dust control have greatly reduced the incidence of the disease.)

After-History —Death from carcinoma of the lung

Dr S R GLOYNE

PARK
SPITAL

R

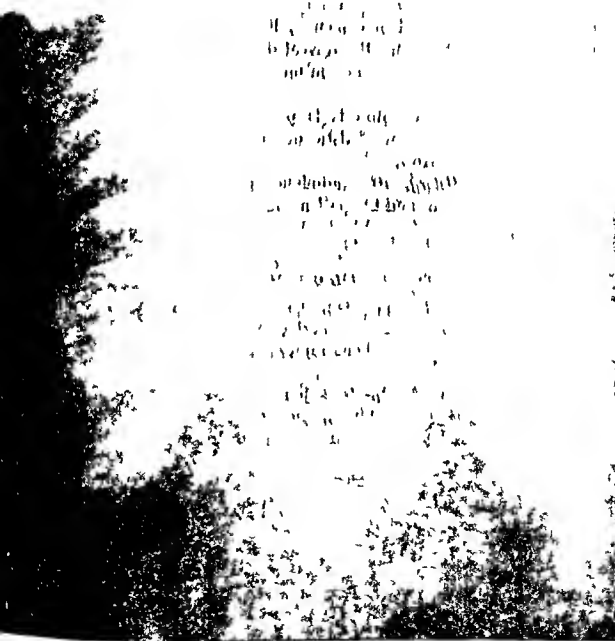


FIG 977

Fig. 978.—SILICOSIS: TUBERCULOSIS. (See Fig 769)

Clinical History.—The man, aged 59, was a retort setter, an occupation involving working among silicon bricks. His cough, which he had for seven years, was worse during the last three years. During the last year he complained of copious yellow sputum, loss of weight and lassitude. Clinical examination revealed marked prolongation of expiration over the whole chest. The sputum contained tubercle bacilli, pyrexia was present.

Radiograph.—Coarse fibrosis is present in both mid zones of the lungs, which is very characteristic of silicosis, with added tuberculosis. The chest is very narrow.

Subsequent History.—After admission pyrexia disappeared, but there was no gain in weight and the patient was sinking when last seen.

Dr G. RAMAGE.

Fig. 979.—OCCUPATIONAL OSTEO-ARTHRITIS. (See Fig 17)

Clinical History.—The man, aged 35, was a wagon repairer for seventeen years, in which occupation he had to use 4-lb and 12-lb. hammers. He suffered a slight injury for which he was X-rayed, with the following result.

Radiographs (Lateral).—The joint surfaces are grossly irregular, there isipping of the radial head, where the capsular ligament is attached. Several chips of bone appear in the joint, one larger than the rest being in front.

(A P.).—Much less obvious changes are in evidence.

N.B.—Such cases coming up before compensation boards present grave difficulties, as symptoms originate from apparently trivial injuries.

Nottingham General Hospital.



FIG 978



1

1

MILESTONES IN RADIO-DIAGNOSIS

	PAGE
II BONIS	12
ASAL ACCISSORY SINUSIS AND EXE	19
ENTAL SYSTEM	20
LEMENTARY SYSTEM	21
RINARY SYSTEM	31
ESPIRATORY SYSTEM	32
ERVOUS SYSTEM	33
ASCULAR SYSTEM	41
USCULAR SYSTEM	44
UCTLESS GLANDS	47
EMALF CENRATIVE SYSTEM	48
OST MORTEN RADIOLOGY	50
APLIMENTAI RADIOLOGY	51
OCCUPATIONAL INJURIES AND DIFASIS	51
EDICO LLGAL	53
ILITARY RADIOLOGY	53
ELMINTHOLOGY	54
ONCLUSION	54

INDEX

A	Accessory teeth 314
	thumb 104
ABDOMINO THORACIC INJURIES chest manifestations	40
abnormal renal artery 32 33	
abscess alveolar 208 316	
apical 206 308 312	
appendix 28 29	
bone 13 184 190	
Brodie's 14 188 190 196	
dorsal 198	
liver 73	
lung 37 38 39 522	
mediastinal 38	
periapical 310 314	
perinephritic 32 33 34	
perirenal 33	
peritoneal 30	
prostatic 33	
pross 13	
pulmonary 37 38 39	
radius 188	
retropharyngeal 23	
spinal calcified 20	
subphrenic 41 426	
teeth 20 508	
tubercular 176 536	
typhoid of tibia 200	
	Active tuberculosis 482 504
	Adamantine epithelioma 41
	Addison's disease 47 48
	Adenitis 27
	Adenocarcinoma 46 50
	Adenoid vegetations 20
	Adenoma 32
	pituitary 42 512 514 517
	thyroid 48 576
	Adhesions pleural 37
	Adrenal 17 34 47 48
	calcified 47
	Air so diffusion 23 41 43 47 48
	Albers Schoenberg's disease 16
	Alimentary system 41 78 51
	Alkaptonuria calculus in 34
	Alveolus abscess of 309 316

- Alveolus, pyorrhœa of, 304, 306, 312
 regression of, 306
- Amœbic dysentery, 25, 26, 29, 30, 408
 infection, 27
- Ampulla of Vater, 26, 28
- Amputations, 106, 172
- Antenna, pernicious, 18, 25, 26, 27, 29, 46
- Anal pain 26
 fistule 26
- Anencephalus, 49, 596
 in utero, 586
- Aneurism, 42, 43, 45, 46, 564, 566
 aorta, 44, 45, 564, 566
- Angina pectoris, 45
- Angioblastoma, 556
- Angiography, 44, 46
- Angioma 42, 46, 47
 calcified 42, 44
 facial and meningeal, 21, 42
- Ankle, bullet in, 63
 dislocation, 128, 266
 fracture-dislocation, 264
 normal 73, 75, 87, 91, 97
- Ankylosis, 196, 270
 hip 274
 knee, 292
- Anterior poliomyelitis, 16
 basal meningioma, 542, 544
- Antliropoid pelvis 582
- Anthropology, 598
- Antiperistalsis, 23
- Antrograms normal, 301
 pathological, 301
- Antrum carcinoma of, 21
 maxillary, 298
 normal, 295
 suppuration, 296
- Anuria, 34
- Anus, imperforate, 29
- Aorta, coarctation of, 46
 disease of syphilitic origin, 44, 50, 564
 double, 47
 œsophagus, effect on, 45
 regurgitation, 44
 right, 46
- Apical abscess, 306, 308, 312
- Appendicectomy, 32, 404, 406
- Appendicitis, 23, 25, 404, 406
- Appendix, 28, 45, 404, 406
 abscess of, 28, 29
 cancer of, 25, 45
 chronic, 23, 25, 404, 406
 concretions in, 22, 31, 406
 foreign body in, 404
 shot in, 404
- Araclnodaetia, 18
- Araclnoiditis 42
- Archd film, 16
- Arm, œdema of post-operative, 45
- Arrest of peristaltic wave, 22, 23
 of tuberculosis, 484
- Arsenic poisoning, 16
- Arteries calcified, 15, 45, 50, 568, 588
 disease of, 45, 46
 hepatic, 32
 renal, 32, 33, 452
 sclerosed 568
- Arteriograms 42, 44, 45
- Arteriography with thionum, 17, 45
- Arteriosclerosis, 50
- Arthritis, acute, 16, 268
 elbow, 14
 experimental, 51
 mutilans, 19
 osteo, 13, 16, 290, 604
 rheumatoid, 13, 174, 290
- Artliropathy, hæmophilic, 14
 pulmonary, 14, 18
- Artificial pneumothorax, 36, 38, 39, 490, 508, 510,
 512, 514, 516, 520
- Asbestosis, 39, 52, 602
- Asearis, 54
 lumbricoides, 27
- Assmann focus of infection, 37, 488
- Astragalus, external tuberosity, 152
 fracture, 156
 necrosis of, 19
- Atelectasis, 37, 38, 39
- Atheroma aorta, 45
- Atlanto-axial, normal, 77
 dislocation, 13
- Atresias, congenital, 27
- Atrophy of bone, 13, 15, 172, 174, 190
 brain, 42, 44
 nervous, of leprosy, 13
- Auricular appendix, carcinoma of, 45
- Axillary girth, 60
- Axis, 77
- Azygos lobe, 488
 cystic disease of, 40

B

- BACK, injuries, 18
 painful, 14, 18
- "Back-fire" fracture, 14, 136
- Band, humerus, 162
- Banner's disease, 19
- Basal anterior meningioma, 542, 544
- Baseball finger, 52, 138
 injuries, 52
- 'Bee-de-flûte' fracture, 126, 146, 150
- Beehterew's disease of sacro-iliac joint, 19
- Belladonna, 23
- Bence-Jones' albuminuria, 258
- Bennett's fracture, 52, 138
- Benzedrine sulphate, 26
- Beri-beri, 45, 46
- Bilateral hydronephroses and hydroureters, 450
- Bilharzia, 31, 32, 34, 39
- Biliary apparatus, 28, 29
 calculi, 23, 32, 394, 402
 fistulae, 25, 26
 function, 27
- Billroth's pyloric hypertrophy, 27
- Bismuth, 16, 21, 22, 23, 31, 36, 51
- Bladder, calculi of, 31, 33, 34, 470
 carcinoma of, 31, 472
 diverticulum of, 31, 472
 examination of, 8
 foreign body in, 49, 474
 injuries of, 34
 papuloma of, 31
 pouches of, 31, 472
 rupture of, 33, 142
 trigone, diseases of, 35

- Bladder tumours of 31 472
 Blast injuries to lung 51 53
 Blood vessels examination of 9
 Bones abscess of 13 188 190
 atrophy of 13 13 172 174 190
 carpal 16
 changes in varicose ulcer 218
 coxioid infection of 18
 condensations multiple 18
 congenital defects 11 42 102-110
 cysts 16
 diseases of incidence of 13
 dystrophies 13 102-106
 embedded 13
 fibrocystic 13 234
 fractures 18 112-172
 grafts 14 16 118 174 198
 Hodgkin's disease 13
 lead in 13 16
 normal 6 101
 phthin 17 172 164
 rarefaction 17 178
 sarcoma 14 13 242-252
 sclerosis 14 13 17 22 188
 sinus 14
 syphilis 12 13 14 17 176 190
 tuberculosis of 12 13
 tumours 14 17 238-258
 typhus 13
 union of 14 132-136
 young transverse lines in 13 18
 Brachial plexus 110
 Brachialis anticus myositis ossificans in 588
 Brain atrophy 42 44
 cortex calcification of 42
 cyst 41 42
 ulcer 42
 tumours 41 42
 Branchial sinus 102 572 574
 Breast carcinoma 49 46
 metastases 16 246 258
 normal 49
 Breech delivery 16
 presentation 16 584
 Brodie's abscess 14 188 190 196
 Bromide sodium 31
 Bronchial fistula 37 37 500
 glands 23 36 40
 Bronchiectasis 33 36 37 38 39 40 434 498
 Bronchiolitis 13
 Bronchitis 37 38
 Bronchograms 38
 Bronchus foreign body in 37
 obstruction 40
 Bulbar palsy 42
 Bullet ankle 63
 brain 41
 heart 43
 localisation of 31
 Buried dental roots 508
 Bursitis 52
- C
- Carcinoma 2 27
 carcinoma of 414
 tuberculous 23 23 29 30
 Caesarean section 13
 Casson workers bone changes in 52
 Calcaneal fossa 47
 peritendinitis 17
 Calcareous degeneration 31 47
 deposit 53 47
 nodules 31
 Calcification adenoma thyroid 13 48 56
 arterio 13 4 50 56
 bone 19
 brain 42 48
 coronary 4 50
 enchondroma 244
 endopericardial 44
 excessive 16
 fibroid 48 580
 filaria 12 47
 foot 13
 gland 27 43 45 479
 phoma 548
 heart 46
 heart valves 4 50
 intercostal 4 51
 kidney 51 5 464
 lip 41
 muscles 47
 pericardium 44 4
 seminal vesicles 33
 shoulder 47
 tumours 41
 veins 46
 Calcinosi unguis 47
 Calculi appendicular 31
 biliary 23 390-402 437
 bladder 31 34 470
 cystine 34
 dissolved 34
 excretion urogram 32 437-470
 kidney 31 32 434-450
 oxalate 394 448
 pancreatic 28 430
 penile 474
 prostatic 31 472
 pulp 310
 renal 31 31 32 51 394 442 444-448
 salivary 31 310
 ureteral 23 31 32 432 468
 urethral 472 474
 uric acid 32
 urinary 34
 in fibrocystic disease 15
 escul 470
 Calloway's test 60
 Callus 17 41 142 146 150 164 166
 excessive of ulna 160 166
 Callus disease 289
 Canals vascular 42
 Cancer anular appendix 43
 bladder 472
 breast 49
 metastases in humerus 16 244
 bronchial 13 34 41 570
 cranium 414
 eardrum 3 360 564
 chest 36
 colon 23 23 414-418
 diverticulum 2 16 33
 implanted on oesophagus 13
 kidney 31

- Cancer, laryngeal, 38
 lung, 36, 38, 40, 41, 524, 526, 530, 532
 metastases in bone, 15, 39, 246, 254, 256
 middle ear, 20
 non-palpable, 360
 œsophagus, 21, 29, 338, 340
 osteomyelitic sinus, 19
 pancreas, tail of, 48
 pleural effusion with, 526
 prostate, 31, 34, 414
 pylorus, 24, 358, 362, 366
 sigmoid, 412-418
 squamous, 32
 stomach, 22-26, 28, 29, 354-366
 uterus, 49
- Canine, unerupted and immature apices, 306
 misplaced, 306
- Capitellum, radial fracture, 130
 separation of, 128
- Carbon tetrachloride poisoning, 54
- Carcinoma *See* Cancer
- Cardia, tumours of, 28, 360, 364
- Cardiospasm, 27, 28, 51, 336
- Caries of cervical spine, 12, 13
 dental, 310
 sieca, 270
- Carpus, 89
- Cascade stomach, 25
- Cascation of kidney, 466
- Castex, use of, 17
- Cavum septum pellucidum, 42
- Cavum vergi, 42
- Celloidin, 51
- Cementoma, 308, 310, 312
- Cerebrum, lacerated, 41
- Cervical band, 110
 process, 110
 rib, 17, 110
 spina bifida, 106, 540
 spine, 12, 99, 260
- Chareot's foot, 174
 joints, 284
 osteoarthritis, 222
- Chauffeur's fracture, 136
- Cheddar Cave man, pelvis of, 598
- Chemotaxis in bone growth, 47, 168
- Chest, collapse of, in osteomalacia, 14
 normal, 35, 36, 37, 477, 479
 dermoid cyst of, 532
 nævus of, 570
 surgical complications, 36
 wall, neoplasms of, 18
- Chiasmatis simulating tumour, 44
- Chlorama, 26
- Cholangiography, 30
- Cholecystectomy, 25, 30
- Cholecystography, 24, 25, 27, 28, 29, 397-402
 sequelæ of, 28
- Choledochoduodenostomy, 28
- Chondroblastoma, epiphyseal, 18
- Chondroma, leg, 244
 spine, 258
- Chondromatosis, 18
- Chorionepithelioma, 49
- Chromophobe pituitary adenoma, 512, 544
- Chyllothorax, 38
- Cine-radiography, 26
- Claudication, intermittent, 45
- Clavicle, congenital defect, 102, 590
 dislocation, 58, 260
 fracture, 58, 122
 rarefaction of, 19
 vicious union, 170
- Cleido-cranial-dysostosis, 18, 102, 590
- Club-fingers, 16
- Coarctation aorta, 45
- Coccidioid infection of bone, 18
- Coccidioidmycosis of lung, 41
- Cœur-en-eurasse, 45
- Coffin bone, 176
- Com in colon, 432
- Colitis, 23, 110
 ulcerative, 27, 408
- Collargol, 31, 48
- Colles's fracture, 134, 136
- Colon, 22, 23, 25, 28, 29
 carcinoma, 22, 23, 25, 27, 416, 418
 coin in, 432
 haustra, 23, 25, 26
 mucosa, 27
 normal, 25, 329, 331
 peristalsis of, 22, 24, 331
 ureteral implantation in, 33
- Complications, amputations, 172
 fractures, 170
- Condyle, of femur, dislocation, 264, 266
 humerus, fracture of, 130
- Congenital absence of lower œsophagus, 334
 absence of radius, 108
 atresias, 27
 cystic kidney, 33, 456
 defects of bones, 16, 42, 102-110
 defects of lumbo-sacral joints, 16
 elevation of shoulder, 108
 heart disease, 45, 102
 hip, 286, 288
 hydronephrosis, 33
 metatarsus varus, 18
 œsophagus, 334
 pseudo-arthritis, 16
 pyloric spasm, 368
 pyloric stenosis, 29, 368
 stricture of ureter, 33
 syphilis, 180, 182, 592
- Constipation, Stierlin's, 23, 37
- Constitutional disease and dental sepsis, 304
- Contraction, "Hourglass," 22, 340, 344, 352
- Contrast media in urology, 34
- Cor pulmonale, 46
- Corpora quadrigemina, 42
- Corrosive poisons, 26, 27
- "Cow-horn" stomach, 22, 319
- Coxa vara, 15, 102, 288
- Coxæ morbus, 13, 272-274
- Cranio-pharyngioma, 598
- Cranium, fibro-osteomata of, 21
 tumours of, 46
- Crepitus, 12
- Cretinism, 13, 18
 hand of, 576
- Cross union, 170
- Crowned teeth, 310
- Cryolite, workers in, 52
- Cuff, periosteal, 176, 594
- "Cup-and-spill" stomach, 428
- Cushing's syndrome, 18

Cystadenoma papillary 30
Cystic duct calculus in 430
Cystitis osteritis fibrosa 30f
Cysticerci 34 600
Cysticercosis 47
Cystitis emphysematous 34
relapsing 34
Cystograph normal 31 32 411
Cystoscopy 31
Cysts brain 41 42
bronchiogenetic 40
choledochus 30
dental 19 314 316
dermoid 38 332 380
echinococcus 27
femur 214
heart 46
hydatid 14 36 37 38 43
mesenteric 29 166 428
ovarian 380
pancreatic 24 30 306
periapical 312
radicular 21
renal 34 43f
spinal 43
subarachnoid 41
thyroglossal 374

D

Dactylitis 19 38 176
Dead hand 32
tooth 20 304
Decalcification 14
in hyperthyroidism 18
Deformans spondylitis 14 202 222
Deglutition 4 25 42
disorders of 22
Dental system 20 304-316
Dentigerous cyst 314 316
Depressed fracture 12 13 17 41 118
Dermatitis 32
Dermoid cyst 38 43 380
abdomen 24
chest 332
forehead 43
lung 38 532
mediastinum 40
ovary 380
Deutschlander's disease 17
Diabetes 15 16 28
insipidus 14
Diaphragm elevation of dome of 29
tumours of 28
Diaphragmatic hernia 44 36 39 31 424
movements 33 37
Diaphyseal aclasia 14 238 234
Diets crises 43f
Digestive tract examination of -
Dilatation bronchi 30
heart 44 43
stomach 21
ureter 430
Dinner fork deformity 38 134
Diodes 30 33 4 46 47 1
Diseases of bones 12-19 174-237
Dislocation ankle 1 8 46f
atlanto axial 13
25

Dislocation clavicle 460
condyle of femur 46
elbow 460
hilla 466
hip 16 44 272 288 288
media tibia 36 314-316
medico legal aspects of 33
metacarpal 462
mid tarsal 46
parietal lip 16
phalanx 462
radius 18 412
scapula 36 46
shoulder 38 46
spine 114 116
synph 33 46f
thumb 36 2
wrist 46

Distomus 4

Distortion of ductum 22 28 29 34

Diverticuli 1 11 1 3

carcinoma in 3
colon 4
duodenum 28 56
gastric 26 9
inflammatory 4
jejunal 4
Meckel's 46 98
oesophageal 33
pericardial 4
pharyngeal 24 332 334
thyroglossal 48

Diverticulitis 28 4 0

Diverticula 21 414 420 322

Ductles blind 47 372-378

Ductus arteriosus surgery of 41

Ductal cap 3 1 302

diverticulum 386

deus 3 27 374 78 350 96

septum 30

tube use of 43

ulcer 23 44 372 374 36 378 380 184
perforation during X-ray examination 30

Duodenitis uncomplicated 26

Duodenum 28 30 44

distortion of 3 46 28 33 374

foreign body in 28 34 412

normal 33

Dwarf 16 34

Dysenteric amebic 3 30 408

chronic 96 408

Dysostosis cleidocranial 102 30

Dysphagia 30

I

Echinococcus 27

Ectoderm 47

Ectopic bone 47 390

pregnancy 49

teeth 313

Inflammation mediastinal 40

pericardial 44 4 46f

pleural 31 3 33 46f

Involvement of cholelithiasis 4

Inflammatory ducts 31

Elbow arthritis 14

dislocation 39 460

- Elbow, excision, 292
 injuries of, 52
 normal, 71, 85, 89, 95
 syngomychia, 284
 tuberulous, 270
 Elephantiasis, 17
 Embryo, 594
 Empyema, 29, 34, 38, 45, 504
 Empyema, 35, 36, 40, 526
 interlobar, 520
 unresolved, 522
 Encephalocoele, 540
 Encephalography, 41, 42, 536
 Enchondroma, 242, 244
 End results, osteomyelitis, 192
 Endometritis, effect on rectum and colon, 29
 Endosteal sarcoma, 246
 Endothelioma, 38, 39
 Enteritis, 23, 27, 30
 Eosinophil pituitary adenoma, 546
 Eosinophilia, 40
 Epidermoids, 43
 supracallosal, 554
 Epilepsy, 42, 43, 562
 Jacksonian, 562
 Epipericardial fat shadows, 46
 Epiphyseal growth, 15, 16, 17, 594
 late, 12, 15, 178
 Epiphysitis, chart, 15
 chondro-blastoma of, 18
 injury of, 146
 normal, 17, 81-90
 separated, 13, 14, 138, 160, 166, 168, 212, 264
 shipped, 14
 Epiphysitis, 17, 190
 femoral, of infants, 102
 syphilitic, 230
 Epithelial hypertrophy, 21
 Epithelioma, 21, 32
 Ipsom salts, chologogic action of, 23
 Erdheim tumours, 42
 Erythema nodosum, 40
 Erythromelalgia, 18
 Ethmoidal sinusitis, 298
 Eventration diaphragm, 360
 Exulsion, phrenic, 490, 506, 412, 514
 Ewing's tumour, 15
 Excision joints, 292
 Exophthalmos, 14
 Exostosis, femoral, 238, 254
 ivory, 14, 240
 scapula, 238
 subungual, 248
 Extradural haemorrhage, 44
 Eye, 20
- I
- Iyers, passage of, 22
 Iliopsoas tubes, 48, 49, 50, 580
 Iliac joint, 170
 Iliac embolism, experimental, 51
 Female generative system, 48, 580, 586
 Femoral vein, fracture of, 46
 Femur, carcinoma, secondary, 254
 chronic osteomyelitis, 192
 cyst of, 213
 fracture of, 16, 17, 18, 19, 144, 146, 150
 femur, hydatids of, 54
 metastatic hypernephroma, 254
 myeloma, 248
 normal, 73, 83, 87, 91
 osteomalacia of, 226
 osteomyelitis of, 184, 212
 periostitis, 16
 plating of, 164
 sarcoma, 248
 separated epiphysis, 14, 264
 Fever, rheumatic, 202
 undulant, 17
 Fibrin balls, 520
 Fibrocystic disease, 15, 16, 33, 48, 234
 Fibroid uterus, 48, 580
 Fibroma, ossifying, 21
 Fibroxoma of uterus, 580
 Fibro-osteomata, jaws and cranium, 21
 Fibrous cystica, osteitis, 556
 osteitis, 230
 Fibula, atrophy of, 174, 190
 changes in varicose ulcer, 218
 false joint, 170
 fractures, 150, 152, 154, 164
 osteomyelitis, 184
 Filaria, calcified, 32, 47, 54
 Fingers, webbed, 106
 atrophy of, 174
 "Fish-hook" stomach, 22, 310, 321
 Fistule, anal, 26
 biliary, 25, 26
 bronchial, 572, 574
 bronchial, 33, 37, 500
 thyroglossal, 572, 574
 urinary, 33
 Fixation of thorium, 51
 Flat feet, 17
 Fleck of barium, 324, 372
 Fluorine poisoning, 52
 Fluoroscope, value of, 26, 37, 46
 Focal epilepsy, 42, 562
 sepsis, 13, 20, 304
 Fatal circulation in sheep, 51
 Fetus, determination of age of, 50, 506
 full-term, 81
 intrauterine, 48, 49, 582, 584
 still-born, 48, 49, 50, 582, 594, 596
 Foot, abnormal, 13, 14, 17, 104
 necessary bones of, 53
 atrophy of, 174, 190
 cavus, 212
 disease, 15, 17, 39
 enchondroma of, 244
 hemangioma of, 17
 mycetoma of, 19
 normal, 75, 87, 91
 plumus, 212
 Foramen of Myer and Fuschka, patency of, 546
 ovale, 45
 rotundum, 42
 Torched dermoid, 43
 Foreign body, appendix, 404
 bladder, 454
 bomb fragments, 54
 bronchus, 37
 capsule of tendon, 20
 colon, 442
 duodenum, 28, 442

Foreign body empyema 260

foot 63
glass 33
ileum 472
inhaled 36 38 39
joint 1"
knee 1"
lung 38 226
œsophagus 24 38 340
pharynx 38
prostate 474
radius 188

Fracture dislocation of ankle 264
of external femoral condyle 266
of spine 114 116
of thumb 264

Fractures 12 13 14 17 18 111-108
base of skull 14 17 41
bec de flute 126 146 150
circulatory changes in bone following 18
clavicle 38 122
crush spinal 114 116
diagnosis of 12 13
extracapsular 144
fatigue 19 54
fissured 112
gunshot 128
interdental spine 21 306
intracapsular 16 144
joints 13
marching 13 1" 3 104
medico legal aspects of 3 390-396
non union 14 170
occipital bone 112
radiation 18 19
radius and ulna 13 132 134
repair of 1" 160-168
ribs 116
site of 1
skeletal fixation of 14
spontaneous 13 18 19 2 0
tooth 21
vault of skull 112 118
vertebral process 14 16 18
fragilis ossium 13 214
frontal sinus normal 23
pathological 296 301
full term fetus 81 228 296
fusospirochætal infection lung 38

G

GALL BLADDER 11 23 24 28 29 31 39" 318
adhesion 24 400
emphysema 29
enlarged 21 39"
examination of 8
normal 21 23 24 39"
pathological 24 29 390-40
to be 1 1 400
Gall stones 21 22 23 24 29 31 386 390 392
400 40 43"
Guthrie Casserini 42
Gangrene 13 33 34
foot 13
gas 4"
lung 33

Gargoylism 18
Gas in acute abdomen 30
in bladder 31
bubble 22 28 33
intestinal 2" 30 32
Gastrectomy 23 282
Gastric See Stomach
Gastritis 23 26 29
hypertrophic form 26
Gastro enterostomy 24 380
Gastroptosis 22 26
Gastroscoy 2" 30
Gastropasm simulating cancer 29
Gaucher's disease 1"
Generative system female 48 380-386
Genital valium traumatic 146
Gigantism 13
Glands bronchial 36 40
calcified mesenteric 2" 31 43" 430
Gloss in prepatellar bursa 39
Glenoid fossa fracture 38 118
Glioma calcified 348
Gout intrathoracic 48
retro sternal 376 378
Gonads 1"
Gout 18 1" 4 278 370
Graft bone 14 16 118 164 198
Grubbe Cole method 39"
Granuloma dental 28
eosinophilic 19
Graves disease enlarged heart in 36
Grawitz tumour 32 46
Great toe fracture 158
Greenstick fracture 12 132 152
Gunner worm 34
Gynaecology X rays in 19 30
Gyrometer 362

H

HEMANGIOMA calcified 1"
Hamatemesis 38
Hematuria 33 446 464
Hemopericardium 43
Hemophilic arthropathy 14 1" 18
Hemoptesis 38 398 399 41 4
Hemorrhoids 26
Hemosiderosis pulmonary 41
Hemothorax 40
Hairballs 23
Hallux dislocation 266
fracture 154
metatarsal 16
radius 278
valgus 212
Hamilton's ruler test 60
Hand 13 18 19 2" 101
congenital defect 101 106
enchondromatous 144
intrauterine amputation of 101
normal 3" 81 82 83
of cretin 26
opera 19
osteomylitis of 1" 26
pneumothorax 39
Hawthorn's nodes 20

- Heart, abnormal, 27, 28, 35, 44-45, 102, 564, 566
 aneurism, 44, 564
 bullet in, 45
 cancer of, 45
 catheterisation of, 46
 dilatation, 44, 45, 102
 displacements, 35
 examination of, 9
 shadows 40, 44, 46
- Hepatic function, 27
- Hernia, diaphragm, 24, 36, 38-39, 424
 inguinal, 27, 29
 lung, 514, 516
 mediastinal, 514, 516
 nucleus pulposus, 16
- Hilar investigation, scale for, 479
- Hip, Charcot's joints, 284
 disease 18
 dislocation 13, 16, 142, 264, 272, 286
 normal, 73-83, 87, 91, 93
 osteoarthritis, 16, 290
 pathological dislocation, 272, 288
 Perthes's disease, 102, 288
 tuberculous, 18, 19, 274
- Hippodini, 34
- Hippurium 32
 per os, 32
- Hirschsprung's disease, 24, 25, 27, 428
- Hodgkin's disease 15, 28, 37, 49, 40
- Hookworm, effect on intestine, 29, 54
 Horseshoe kidney, 456
- Hourglass stomach, 22, 23, 440, 444, 452, 460
- Humerus, band on, 162
 fracture, 14, 124, 126, 128, 130, 156
 gummata, 182
 hydritis of 54
 myeloma 240, 250
 osteoma, 186, 240, 248
 osteomyelitis of, 186, 196, 232
 plating of, 162
 sarcoma, 15, 246
 separated epiphysis 160, 166, 168
 supracondylar process, 166
 syphilis, 180
 tumour, 48
- Hupert's disease 258
- Hydrated bone 14, 37, 42, 54
 brain 42
 cysts 14, 27, 36, 37, 38, 43
 hepatic 23, 24
 lung 35, 36, 37, 38, 490, 600
- Hydranmos 49
- Hydrocephalus 41, 538-584
- Hydrocephrosis, 42-43, 450-452, 454, 458
- Hydrometer, 450-454
- Hydropneumothorax 41
- Hydropyopneumothorax, 44
- Hyperemia 46
- Hypermobility of cecum, 25-44
- Hypernephroma 43, 254, 362-364
- Hyperostosis 42
- Hyperparathyroidism 45-48
- Hypertension, etiology of 44
- Hyperthyroidism 45-48
- Hypervitaminosis in new-born, 49
- Hypopharynx 20
- Hysterosalpingography 49
- I
 Iliacitis, terminal, 27, 29, 388
 Ileocolic tuberculosis, 24, 29, 30
 Ileostomy, closure of, 29
 Ileum, foreign body in, 23, 432
 Ileus, 26
 duodenal, 24, 27, 374, 378, 380, 386
 Ilium, fracture of, 264
 rarefaction of, 102
 sarcoma of, 256
 tuberculous, 272
 Impacted teeth, 310, 314, 316
 Incisura cardiaca, 26
 Infantile, 13, 15, 18
 Infarcts, pulmonary, 37, 38, 39, 40, 45
 splenic, 48
 Influenza, 37
 Insufflation, perineal, 35
 Intercalary bones, 15
 Intercondylar space, 16
 Interdental spine, 306, 314
 Internal disease, X-ray diagnosis of, 6
 Interproximal radiograph, 314
 Intervertebral discs, 15, 16, 17, 43
 Intestine, abnormalities, 28, 40
 mucosa, effect of hookworm on, 29
 normal, 25, 325, 331
 obstruction, 25, 26, 27, 29, 388, 428
 Intracranial calcification, 42, 542
 Intratracheal tumour, 37
 Intrauterine death, 48, 582
 amputation, 106
 Intubation-a oesophagus, 338
 Intussusception, 25, 26, 28, 29, 416
 Iodide, sodium, 32, 33, 42, 49
 Iodipin 20, 43
 Ischium, rarefaction of, 102
 tuberculous, 272
 Ivory exostosis, 14, 240
- J
- JACKSONIAN epilepsy, 562
- Jaw, fracture, 120
 tumour, 14, 24
- Jejunal, cancer, 28
 diverticula, 24
 lymphogranulomatosis, 26
 obstruction, 384
 ulcer, 24, 378, 384
 valvular constrictions, 327
- Joint, capsule, 18
- Joints, excision of, 202
 false 170
 haemorrhage, 13
 injuries and diseases of, 13, 260-292
 loose bodies in, 13, 148
 synovial, 16
- K
- KARLIS'S disease, 258
 Kirschner-Hack's disease 46
 Kohnsack's disease, 44
 Keratin poisoning, lung symptoms, 40
 Kev. radiograph, 564

- kidney artery 32 33 402
 calcification of 33 34 404 405
 calculus 23 31 32 34 35 391 449 474-480
 caseation 466
 congenital cystic 33 405
 crises 444
 cysts 34 406
 double ureter 404
 examination of 8
 floating 406 408
 horseshoe 406
 hydronephrotic 32
 infantilism 10
 malignant disease 33 405 406
 movable 406 408
 pelvis perforation of 33
 position of 32
 sind 444
 shadow 31 32
 suppuration of pulmonary complications 39
 traumatic conditions 10 14 1
 tuberculous 31 33 34 400 466
 tumour 32 404 405
- knee ankylosis 29
 cartilages 17
 foreign body in 16 392
 fracture 38 148
 loose body in 13 148
 normal 3 83 87 91 97 178
 osteoarthritis 268 290 300
 oxygen injection into 18
 synovitis 268
 traumatic lesions of 34 404
 tuberculosis of 178 179 278 290
- knock knee 280
- Köhler's disease 13 10 17 236
 Kummel's disease 14 194
 kymograph 20 41 40 46
 kyphosis juvenalis 16 43 204

I

- Lavoisier mechanism of 49
 Laminographs 44
 Laparotomy 20 23
 Larcum 26
 Larynx 40 42
 carcinoma 38 40
 normal and abnormal movements 20 37
 papilloma 38
 Lead poisoning 15 16 2
 Leather bottle stomach 24 306
 Lecithin and egg yolk 2
 Legge's pseudo-coxitis 17 288
 Leiomyosarcoma 28
 Leontiasis ossium 216
 Leprosy 13 16 18
 bone changes in 18
 Leukemic disease 27 30
 Ligamentum ossibus stylus hyoid 336
 intelle rupture of 148
 Lipidol 16 20 30 36 41 44 49 50 511 536
 41
 bronchiectasis 37 40
 lung 37
 maxillary antrum 20
 uterus 380

- Lipomas 30 47
 Lipomato 1 howel 388
 Liver abscess 23
 hydatid 23 24 34
 violation of 24 27 31
- Lobectomy 38 39 40
 Loose body knee 13 148
 Lueckenschidel 13
 Lumbar spine 114
 fourth disc 16
 spina fluid 106 40
- Lumbo sacral disc 16
 Lung abscess of 17 38 39 322
 action of gises on 32 34
 aneurism 46
 apices 10
 blast injury of 31 33
 carcinoma 30 40 41 521 526 530 537
 cavities 10 39
 coccioid infection 39
 collapse 40
 cystic disease 38
 dissection of industrial 38 40 50
 eosinophilic 40
 examination of 8
 fibrosis of 37
 fuso prochlorit infections of 38
 hydatid of 10 36 37 38 40 490 600
 influenza 37
 injuries of 10
 markings 41
 opacity 10 36
 open honeycomb 38
 sarcoma 36 37 41 530
 syphilis 38 39
- Lymphadenitis 208
 Lymphadenoma 38
 mediastinal 38
 Lymphogranulomatosis of jejunum 46

M

- Madelon's disease 10 236 268
 Malignant gastric polypus 27 308
 hourglass stomach 23 360
- Malpraxis 33
 Mammary See Breast
 Mamograph 44
 Mandible dissolution of 16
 edentulous normal 310
 fracture 10
 myeloma 40
 necrosis 2 1
 osteitis 216
 residual infection 310
 Marble bone 16 18 312
 Marburg fracture 13 17 32 154
 Mass peristalsis of colon 44 331
 Mass radiography 33 40 41
 Mastoid 11
 chronic 30
 normal 30
 osteitis 30
 suppurating 30
- Maxilla 11
 antrum 20 31 34
 osteitis 16

- Maxilla, symphysis of, 298
 Meat, opaque, 21, 22, 24, 27, 321, 325
 Measles, pneumonia 37
 Meckel's cartilage, 394
 diverticulum, 26, 28
 Mediastinum abscess, 38
 air in, 40
 dermoids 40
 dislocation, 36, 514, 516
 flap 514, 516
 hemangioma 40
 hernia, 514, 516
 lymphadenoma, 528
 tumour, 40, 48
 Medico-legal, 53, 590-592
 Mediterranean fever, 15
 Megacolon, 28, 30, 428
 Melanin 408, 410
 Melorheostosis, 14, 17, 18
 Meningeum of base, 43, 542, 544, 546, 552
 parasagittal, 546
 vault, 550
 Meningitis, spinal 546
 lipiodol injections in, 536
 Mercury ointment, 47
 Mesenteric cyst, 29, 366, 428
 glands, 27, 31, 437
 thrombosis, 27
 Metacarpals, abnormalities, 104
 dislocation, 138, 262
 enchondroma, 242
 fracture 138, 176
 necrosis, 180
 osteoma of, 180
 perostitis of, 180
 separated epiphysis, 138
 syphilis of, 476
 tuberculous, 176
 Metastases, deposits 15, 16, 36, 39
 osseous, 20, 31, 39, 254, 256, 258
 Metatarsalgia, 15
 Metatarsals, fractures of, 52, 154, 158
 perostitis of, 180
 Metatarsus primus varus, 104
 varus, 48
 Micturition, disorders of, 31, 34
 Mid tarsal distortion, 266
 Midwifery, X-rays in, 9
 Migraine 27
 Milium deposit 37, 504
 Milkman's syndrome, 17
 Miners' phthisis, 72
 Molars, curves of, 340
 impacted 340, 346
 normal 20, 304
 Mouth-bis suction drainage 39
 Mouth-bis sclerosis 570
 Mouth-bis rhoea, 18
 Morphia 26, 27
 Morquio's disease 48
 Motility, gastric 24
 Motor road 22
 Movable kidney 456, 458
 Mucosa, colonic 27
 gastric 24, 25, 26, 327
 relief patterns 26, 327
 small intestine 28
 Mullerian duct 1, 19
 Muscles, psoas, 32
 system, 47, 588
 visualisation of, 51
 Myasthenia gravis, 47, 48
 Myeloma, 14, 160, 240, 248, 250
 Myelomatosis 258
 Myelopithec albuminosis, 258
 Myocarditis, gummatous, 46
 Myositis ossificans, 47, 130, 588, 590
 progressiva, 47
 Myxodema, 45, 48
- N
- Nipples of chest, 570
 Nasal bone, fracture, 118
 normal sinuses, 10, 295, 301
 system, 10, 295-302
 Nasopharynx tumours of, 39
 Necrosis of bone, 14, 18, 170, 172, 180, 192, 224
 Neoskiodan, 33
 Nephrectomy, 454, 464
 Nephritis, acute, heart in, 46
 Nephrotomy, 31
 Nerve pangs in defects of lumbo-sacral joints, 16
 Nervous system, 41, 544-562
 Neuralgia, 43
 Neurasthenia, 20
 Neuroma, acoustic, 41, 554
 'Niche en plateau,' 25
 of duodenal ulcer, 24
 of gastric ulcer, 22, 23
 Nitric acid fumes poisoning, 52
 Nodular form leprosy, 13
 Non-union of fractures, 14, 170
 Normal barium meal, 321, 325-331
 bones, 65-104
 breast, 49
 chest, 477, 479
 colon, 329, 331
 cystography, 441
 epiphysis 17, 81-90
 gall-bladder, 395
 gastric mucosa, 24, 25, 327
 lung, 477
 mastoid, 302
 nails, 20, 304
 nasal sinuses, 10, 295, 301
 oesophagus, 349
 pelvis 70
 pyelography, 34, 32, 437, 439
 renal pelvis, 33, 437, 439
 stomach, 349, 423, 325-327
 teeth, 20, 304
 theca, 534
 urograph, 445
 Nucleus pulposus, 16
- O
- Obstetrics, X-rays in 9
 Obstruction, intestinal, 25, 26, 27, 388, 428
 jejunal 784
 portal, 26
 pyloric, 24, 28, 468
 Occipital bone, fracture of, 442

Occupational injuries and diseases 51 60- 603
 Odontomes epithelial 21
 Oesophagitis simulating tumour 30
 Oesophagus 23 24 30 43
 aorta on 43
 cancer 21 29 338 340
 cardiospasm 27 28 31 336
 date stone in 22
 dilated 27 30
 diverticulæ 23
 effect of corrosives on 26 27
 foreign body in 24 340
 lower congenital absence of 334
 normal 319
 paralytic 23
 stricture 2- 26 28 30 334
 tumours of 30
 varices 24 26 28
 Olecranon fracture 132
 wired 132
 Olive oil 26
 Opique catheter 31
 enema 23 27 410 422
 menl 21 22 23 24 25 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000
 medium 20 41 49 51
 Open honeycomb lung 38
 Opera hands 19
 Orbit tumour of 13 298
 Oreludectomy 34
 Organs hollow examination of 7
 Os acetabuli 39
 Os calcis cysts of 19
 fracture 134
 tuberculous 28
 Os vesali 180
 Ossification muscles 14 13 398 399
 Ossified stylo hyoid ligament 336
 Osum fragilis 214
 contraction 216
 Osteitis deformans 14 15 218 220 221
 fibrosa 13 14 21 220 221
 non suppurative 15
 of pubis following prostatectomy 19
 Osteoarthritis 13 16 18 290 304
 arthropathy 13
 Charcot's 222
 knee injury on 222
 Osteochondroma pelvic 19
 Osteoclastoma myeloid sarcoma 21
 Osteogenesis imperfecta 18 216
 Osteogenic sarcoma 24 246 248
 Osteoma 19 180 240 248
 radius 20
 Osteomalacia 14 15 17
 chest 14
 femur 226
 hind 226
 Osteomyelitis 1- 14 1 19 39 181 186 190 191
 136 224 225
 Osteopetrosis 16
 Osteopikosis 16
 Osteoporosis 15 16 17 18 19
 Otitis media 20
 Ovarian cyst 380
 dermoid 380
 metastases 381
 Oxalate calcium 33 448
 Oxycetyl 38

P

Paget's disease 16 18 21 218 220
 quiet necrosis 192
 Painful back 14 18
 Palpy bulbar 42
 Pancoast's syndrome 40
 Pancreas aberrant 30
 calcification of 29
 calculi 29 29 430
 carcinoma 28 48
 cyst 24 30 366
 disease of 28
 Pancreatitis effect on stomach 27
 Pinner's disease 17
 Pantopaque 43
 Papilloma bladder 31
 bronchi 38
 gastric 32
 kidney 32
 larynx 38
 Parachutists injuries of 33 34
 Paralysis maternal obstetric 30
 Paralytic dislocation 16
 Paraplegia 13
 Parasagittal meningioma 346
 Parathyroid and bone growth 13
 extract 13
 tumour 48
 Pitella dislocation 30
 fracture of 148
 Patent ductus arteriosus 46
 Pelvimetry 48 49 38
 Pelvis anthropoid 38
 Cheddar Cave man 398
 flattened 382
 fracture of 140 141
 normal 38 38 93 38
 osteochondroma 19
 platypeloid 382
 renal 33
 normal 33 43 330
 small 38
 visualization of 32
 Penicillin in acute osteomyelitis 19
 in pneumococcal empyema 40
 Penile calculus 474
 Perforated duodenal ulcer 384
 Periapical abscess 110 114
 cyst 31
 Pericardial diverticulum 43
 effusion 44 45 38
 Pericarditis 44 45 38
 Pericardium calcified 44 45
 Pericarditis 26
 Pericarditis tuberculi 31 32
 Perinephric abscess 3 13
 suppuration 32
 Perodontal membrane atrophied 314
 Perodontitis 306 308
 Periosteal bone 47 176 180 181 301
 sarcoma 21 24 25
 whit w 3 176
 Perostitis 16 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000
 terrestrial 18 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000
 terrestrial

- Peritoneum: barium injections into, 51
 gas in, 28
 Peritonitis, miliary, 50
 Peritonsillar abscess, 25, 26, 27
 Persimmons, 27
 Perthes' pseudo-coxalgia, 13, 15, 102, 288
 Pes cavus, 212
 plumis, 212
 virus metatarsi, 19
 Petrosal suppuration, 20
 Philumx dislocation, 262
 enchondroma, 244
 fracture, 138, 158
 myeloma of, 180
 Pharyngeal diverticulum, 23, 25, 332, 334
 herma, 40
 tonsil, 20, 48
 Phlebotasia, 45
 Phleboliths, 44, 45, 439, 441
 Phlegmonous gastritis, 25, 28
 Phosphorus poisoning, 16
 Phrenic evulsion, 490, 506, 512, 514
 Phthisis, 35, 36, 37, 38, 512-524
 basal, 35, 506
 focus of, 35-37
 massive, 514
 nurses, 52
 Phytobezoars, 25
 Pilon in prostate, 174
 Petersen's, 16, 144
 Pinal gland, 17, 43-44, 48
 teratoma, 48
 tumour, 42, 552
 Pitfalls in urinary diagnosis, 139, 441
 Pitressin, 25
 Pituitary adenoma, 12, 42, 542, 544, 546
 fossa, 14
 gland, 13, 17
 Placenta, 49, 51
 previa, 49, 50, 51
 Plating bones, 15, 162, 164
 Plesiomis bones in slate, 500
 Pleura of cadaver, 50
 Pleural adhesions, 37, 502
 cavities, 35
 effusions, 21, 35, 36, 39, 50, 492, 526
 exudates, 38, 41
 with gas replacement, 526
 Pleurisy, 39, 492
 Plummer's esophageal bag, 140
 Pneumatic drill workers, hands of, 52
 Pneumatic mastoid, 20, 302
 Pneumococcosis: coal miners, 52
 Pneumocectomy, 38, 40
 Pneumonia, 25, 35, 37, 38, 39, 40, 41, 496, 500
 following measles, 37
 lipoidal, 40
 opacity of, 36
 post-influenza, 36
 silent, 37
 unresolved, 39, 520
 Pneumonia: acute interstitial, 39, 40
 Pneumopericardium, 44
 Pneumoperitoneum, 40, 50
 Pneumopyelitis, 5
 Pneumopyelopericardium, 44
 Pneumothorax, 6, 8, 25, 490, 508, 510, 512, 514
 spontaneous, 6, 30, 49, 490, 502, 516, 520
 Pneumothorax: tension, 40
 Polymyelitis anterior, 16
 Polyoperation, 26
 Polycystic disease, 33, 462
 Polypus: antrum, 301
 colon, 25
 gastric, 27, 358
 Porrocephaly, 43, 44
 Porrocephalus, 39
 Portal obstruction, 26
 Post-mortem radiology, 50
 Pott's disease, 15, 198, 202, 516
 fracture, 140, 152, 154
 Pouches, vesical, 31, 472
 Pregnane, 15, 21, 48, 49, 50, 582-586
 Premolar, misplaced, 312
 Prepatellar bursa, glass in, 592
 Pringle's disease, 43
 Proctoscope, 25
 Progressive bulbar palsy, 42
 Propeller fracture, 14
 Prosectum, 51
 Prostate, abscess of, 33
 calculus, 31, 472
 carcinoma, 31, 34, 414
 ducts of, 34
 enlargement, 33
 metastases, 15
 pin in, 154
 valve, 32
 Protrusion of labium, 102
 Psammoma bodies, 41, 50
 Pseudo-arthritis of leg, 16
 Pseudo-coxalgia, 13, 288
 Psoriasis, abscess, 43
 muscle, 32
 Pulmonary abscess, 37, 38, 522
 arthropathy, 44
 infarct, 37, 38, 39, 45
 nodular, 37, 40
 spirochaetosis Castellani, 501
 Pulp, dental, 20, 310
 Psychitis, 33
 Pycnograph, abnormal, 31, 32, 34
 excretion, 33, 137, 460
 normal, 32, 34, 439
 Pycnophrosia, 460
 Pycnotomy, 31
 Pyloric hypertrophy, Hillroth's, 26, 27
 carcinoma, 24, 356-366
 spasm, 26, 368, 370
 stenosis, congenital, 28, 29, 368
 Pyorrhea alveolaris, 304, 306, 308, 312
 Pyothorax, 496

Q

- Quadrants, 581
 Quiet necrosis, Paget's, 16, 21, 162, 218

R

- Radial capillary, 17, 130
 Radio-opaque substance: methods of introduction, 7
 Rabus: abscess of, 188
 cellulosa, 166, 170
 congenital absence, 108, 192

- Ridius cross union 170
 - dislocation 262
 - foreign body 188
 - fracture of 13 39 130-136
 - greenstick 132 166
 - non union 170
 - osteoma 250
 - rickets of 208
 - tuberculous 188 190
 - Radon seeds 434
 - Rathke's cysts 43
 - Raynaud's disease 18 44 45
 - Recklinghausen's Von disease 21
 - Rectum operations on and urinary derangements 34
 - Rectus abdominis ossification of 388
 - Recurrent gastric ulcer 348
 - Regression alcohol 306
 - Rehef radiograph 24 227
 - Renal See kidney
 - Repair of fractures 17 160-168
 - Respiratory system 35 47-52
 - Retropharyngeal abscess 25
 - Retro sternal goitre 78
 - Retroperitoneal lipoma 30
 - Rheumatic fever 502
 - heart 46
 - Rheumatoid arthritis 13 18 174 590
 - Ribs cervical 110
 - regeneration of after resection 15
 - Rickets 31 206 209
 - renal 10 34
 - Röntgenology Oral 20
 - Riot buried 309 314
 - cysts 21
 - fillings 20
 - Roundworms 54
 - Rupture of sclerosed artery 508
 - Rush peristalsis 52 331
- S
- SACRO ILIAC JOINT 16 47 564
 - tuberculosis of 18 56 585
 - tuberculosis of healed 588
 - Sacrosciatic joint 15 19 73
 - Salivary calculus 25 336
 - Band renal 444
 - Sarcoidosis 18 30 40
 - Sarcoma bone 17 14 1 18 51 245 516 548 550
 - 4
 - chest 30 38 524 525
 - endo and exo-gastric 5
 - endosteal 240
 - humerus 15 250
 - iliac 250
 - kidney 75
 - lung 30 38 524 532
 - maxilla 208
 - primary 250
 - scapula 250
 - skull 5
 - stomach 20 58
 - tibia 50
 - ulna 160
 - Saw tooth contours 57
 - Scale for bulbar investigation 479
 - Scleritis anterior syndrome 17
 - Scler. encephaloid aneurism of 46
 - Scaphoid carpal fracture of 13 138
 - Scapula acromion fracture 124
 - axillary border fracture 154
 - exostosis 238
 - glenoid fossa fracture 154
 - sarcoma 20
 - Scheuermann's disease 10 17
 - Schizophrenia treatment of convulsive fractures in 17
 - Schlichter's disease 155
 - Schmincke's tumour 50
 - Schoenberg, Albers 16 312
 - Schmeller Christian's disease 14 15
 - Serfick 536
 - Serratus cancer 57
 - Scleroderma 16 18 29
 - Sclerosis bone 14 15 17 52 188
 - Munkelberg's 570
 - pulmonary 45
 - Scoliosis 12 31 205 210
 - Serotum guinea worm in 47
 - Scurvy infantile 13 15 18
 - Sella tumours 41 54-548
 - turcica 13 41 42
 - Seminal vesicles 33 34
 - calcification of 73
 - Separated epiphysis of femur 14 564
 - humerus 11 160 161 169
 - tibia 215
 - Sepsis dental and constitutional disease 504
 - foci of 20
 - Septic arthritis 508
 - Septum interosseous ossification on 589
 - Sequestrum 170 171 160 190 190
 - Sesamoid bone fracture 14 158
 - Shot in appendix 404
 - Shoulder congenital elevation 108
 - dislocation 58 60
 - injuries of 52
 - normal 61 83 8 89 95 99
 - tuberculous 570
 - Sigmoid carcinoma 412-418
 - volvulus 80
 - Silent pneumonia 37
 - Silhouette radiograph progress 14 7-67
 - Silico 13 40 52 3 604
 - tuberculi 604
 - Sinuses bone 59 100
 - branchial 105 575 574
 - frontal 105
 - normal 59
 - maxillary 105
 - nasal 15 5 301
 - of Valsalva 45
 - pyramidal 25
 - thyroloidal 575 574
 - Sinusitis 90 518
 - Skeletal lipid granulomatosis 15
 - Skeleton maturity of 19
 - Skull adolescent 57
 - arterial grooves of 17
 - carcinoma 28
 - defects of 13 47
 - fracture 15 17 18 41 4 11 118
 - normal 17 5 99
 - 1 get 518
 - sarcoma 5

- Slipped epiphysis 14
 Smith's fracture 136
 Smith-Petersen nail 16, 144
 Sodium bromide, 31
 iodide 12, 33, 42, 46, 49
 tetraiodophenolphthaleine, 21
 Solution G, 31
 Spalding's sign of fetal death, 49, 382
 Spasm, abolition of, 26
 appendix, 401, 406
 duodenal 27
 pyloric, 26, 368, 370
 Sphenoidal sinus, 20, 44, 295
 Spina bifida 106, 310
 Spinal canal, dilatation of, 44
 Spine, abscess, 202
 circumferential 258
 curves 12, 13, 198
 chondroma, 258
 cysts, 13
 dislocation, 114
 examination, 12
 fractures, 18, 53, 114, 116
 hydatids of, 54
 injuries, 15, 16, 53
 myeloma, 14
 normal 77, 99, 101
 Paget's osteitis deformans, 218
 tuberculosis 17, 198, 218
 tumours, 41, 544
 typhoid 13
 Spirochetosis Castellani, 504
 Spleen, calcified 48
 cylindrical foci of, 48
 infarct, 48
 mobile 50
 tuberculous, 48
 visualisation of, 24, 27, 29, 51
 Splenectomies, 48
 Splints, minimum 13
 Spondylitis, 15, 17
 adolescents, 16, 222
 deformans, 14, 202, 222
 osteoarthritic 222
 Spondylolisthesis 14, 19, 224
 Spontaneous fracture 13, 18, 220
 Spontaneous pneumothorax, 36, 49, 49, 490, 502, 516, 520
 Sprague's shoulder, 108
 Sprue 17, 30
 Spur 46, 172
 Steatoma 15
 'Steer-horn' stomach, 22, 324
 Stomach's gastric 24
 normal 51, 564
 pyloric, 368
 Stool, 41, 43, 48
 chronic constipation 47
 Still-birth 48, 81, 228, 596
 Stomach cancer 22, 23, 24, 25, 26, 28, 29, 354-365
 cancer, 25
 cup and spill, 428
 dilatation 21
 disorders of 41
 diverticulum 26, 29
 effect of caustics on 26, 27
 epidural exogastric stream 26
 examination pre-operative 29
 Stomach, exterior wall, 27
 'fish-hook,' 22, 319, 321
 'hourglass,' 22, 23, 311, 340, 341, 352, 360
 'leather bottle,' 21, 366
 motor function, 22, 24
 mucosa, 21, 25, 26, 327
 normal 22, 25, 319, 323, 325, 331
 oedema, 29
 papillomatosis, 352
 polypus, 29, 358
 'steer-horn,' 22, 319, 323
 stenosis, 23, 368
 syphilis, 21, 29
 tuberculosis, 25, 352
 tumour, 23, 25, 26, 29
 ulcer, 22, 26, 27, 28, 29, 310, 312, 314, 316, 318, 350, 352, 354, 362, 376
 niche of, 22, 23
 volvulus, 28, 30, 50
 wall, thickening of, 30
 'Stone man,' 47
 Structure, oesophageal, 22, 28, 334
 Stylohyoid ligament, ossified, 336
 Subarachnoid cysts, 43
 Subdural haemorrhage, 43, 44
 Subperiosteal resection, 15, 192
 haemorrhage, 15
 Subpyloric abscess, 21, 126
 Substernal goitre, 576
 Subtentorial tumours, 44
 Subungual exostosis, 238
 Succussion splash, 35
 Sudek's atrophy, 17
 Suler, brain, 42
 Supraciliary epidermoid, 555
 Supracondylar process, 166, 168
 Supranatilloid fracture, 152
 Swallowing difficult, 22, 24, 42
 Sylvian aqueduct, tumours of, 43, 44
 Sympathectomy, 25
 Symphysis, pubis, 49
 separation of, 45
 Symptom-complexes, 24
 Syndactylism, 108
 Synovitis of knee, 268
 Syphilis, 12, 13, 14, 15, 17, 18, 39, 44, 50
 bone, 12, 13, 14, 17, 176, 180, 182, 200, 221, 241, 502
 congenital, 26, 200, 592
 gangrene of foot, 15, 49
 knee, 268
 lung, 48, 49
 stomach, 21, 29
 teeth, 21
 ulna 180, 182, 200
 Syringomyelia, 18, 42, 251

- Teeth semile attrition of 308
sepsis of and constitutional disease 304
socket of healing 310
- Tenon capsule of 40
- Teratoma 40 42 48 532 580
- Terminal ileitis 27 388
- Tetraiodophenolphthaleine sodium 24
- Theca normal 534
- Thiemann's degeneration 13
- Thoracic aneurism 44 564 566
- Thoracoplasty 506 518
- Thorax organs of level of 50
- Thorium 17 24 25 48 51
dioxide 24 27
fixation of 51
hydroxide 25
- Thorotrast 24 26 29 31 43 45 48 49 51 512
546
- Thrombosis 45 46
axillary vein 45 46
mesenteric 27
- Thumb accessory 104
dislocation of 26
fracture dislocation of 264
fracture of 138
- Thymus 48
enlargement of 47
- Thyroglossal cyst 574
sinus 572 574
tract 48
- Thyroid adenoma 48 570
gland 47
lingual 48
metastases 15
system 17 47 574 578
- Tibia abscess of 188 200
atrophy of 174 190
bone graft 164
changes in varicose ulcer 218
cyst of 14
false joint 170
fibula articulation subluxation of 17
fracture of 19 51 140 150 152 154 164
greenstick fracture of 152
hydatids of 51
osteitis deformans 220
osteomyelitis of 186 190
plating of 162
rickets 208
sarcoma 570
serrated epiphysis 212
syphilitic periostitis 200
wiring of 162
- Toe great fracture of 158
- Tomograph 59 38 39 41
- Tonsil pharyngeal 20 48
- Trachea 39 40
- Tracheal streak 47 500 576
- Transposition viscera 418
- Transthoracic approach for gastrectomy 57
- Traumatic scoliosis 210
- Trepinnings localisation of 41 561 570
- Trochanter epiphysitis of 180
- Trophoneurosis 17
- Truncus arteriosus 17
- Tuberculin test 38
- Tuberculosis abscess 176 576
acute miliaris 480
- Tuberculosis bone 12 13 59 176 180 280
calcareous nodules 36 482
cavities 3, 282
dactylitis 58 176
genito urinary 33
glands 36
hand 18
ileo caecal 27 41 29
joints 178 20 27 574 276 278 280
kidney 31 34 450 466
perigastric 35
pleurisy 49
pneumonia 35
pulmonary 35 57 37 40 41 48 574 576 578
604
radius 188 196
sacro iliac joint 18
healed 584
sclerosis 604
simulated 17 37 39
spine 17 198 218
stomach 57 572
tarsus 292
- Tularemia 38
- Tumours bladder 31 47
bone 14 17 42 238-258
brain 41 47 43 512-551
calcified 41 42
diaphragm 38
Ludhiana 42
Living's 15
gastric 23 25 26 29 351-366
intestine small 20
intrathoracic 43
intratracheal 37
jaw 14 21 316
lung 30 37 38 39 574-582
neurofibromatous 39
pituitary 12 512-518
renal 32 454 456
spine 41 43 574
suprasellar 41 42
thoracic 37
vesical 31 47
- Twins 584
- Typhoid disease of bone 13 500
- Typhus 15
- L
- ULCER acute 2
canceromatous 3 4
colitis 23 57 408 410
crater 25
duodenal 53 24 25 17 374 376 378 180 184
gastric 2 26 57 58 59 180 181 184 186
348 350 352 354 356 378
jejunal 24 178 344
- Ulna callus on 160 166
enchondroma 54
fracture 57 130 134 160
greenstick fracture 11 15
osteitis deformans 27
osteomyelitis 192
rickets 208
styloid process 174
syphilis 180 182 200 57
ultra violet rays effect on rickets 586

